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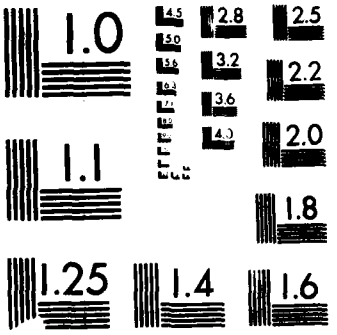
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EMERGENCY MANAGEMENT AGENCY

AD-A207 448

AFFORDABLE STRATEGIES TO IMPROVE INDUSTRIAL RESPONSIVENESS

Volume 8: Possible Uses of Standby and Voluntary Agreements

MARCH 1988

TR-5142-6

OPTIONS AND COST OF IMPROVING INDUSTRIAL RESPONSIVENESS

VOLUME 3: POSSIBLE APPLICATIONS OF STANDBY AND VOLUNTARY AGREEMENTS

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ES.1 INTRODUCTION

This report examines possible applications of standby and voluntary agreements to improve emergency responsiveness in a number of key industrial sectors. It identifies industrial responsiveness problems and describes possible approaches to deal with them. It also provides a preliminary analysis of the cost effectiveness and political feasibility of each approach.

Because this report is a think piece on possible applications of standby and voluntary agreements, we have endeavored to consider the widest possible range of agreement uses. Therefore, industrial sectors covered in this report are important, but not necessarily the most important from a national security standpoint or the best candidates for new agreement programs. They were chosen because they encompass a broad spectrum of responsiveness problems which can be addressed using a wide variety of agreement approaches.

ES.2 STANDBY AND VOLUNTARY AGREEMENTS

In Volumes 1 and 2 of this series of reports, we analyzed standby and voluntary agreements in depth. In the introduction to this third volume, we repeat our definitions of each agreement and summarize key issues with respect to their implementation.

- A standby agreement is a contractual commitment concerning specific goods and services to satisfy increased needs during an emergency. It can be used for a variety of purposes, including: accelerated and increased production of defense items; conversion of commercial capacity to defense production; application of commercial resources in a military role; and earlier production of items needed to support industrial expansion

- A voluntary agreement is an association of companies granted antitrust relief under Section 708 of the Defense Production Act to engage in activities in support of national security needs. It can be used to help accelerate and increase production of defense items, convert capacity, standardize components and production processes, alleviate bottlenecks, allocate scarce resources, and improve production scheduling.

ES.3 AGREEMENTS DESIGNED TO REDUCE BOTTLENECKS

Both standby and voluntary agreements can be used to reduce supply and process bottlenecks. For a supply bottleneck, we examine large aircraft forgings. Order-to-delivery lead times for such forgings commonly exceed six months and have increased to over two years during periods of increased demand. Both standby and voluntary agreements could be used to balance demand among forging producers. A standby agreement could permit a forging consumer to order the transfer of forging dies under emergency conditions, if an alternate firm could produce the needed forging sooner. A voluntary agreement could provide forging companies with a means of allocating work to meet emergency needs and to exchange production information to achieve more efficient operations industry-wide.

For a process bottleneck, we examine test equipment. Shortages of such equipment are commonly identified as impediments to increased output of defense systems. In this report, we examine how standby and voluntary agreements could be applied with respect to three different industrial sectors to reduce this potential bottleneck. We analyze how a standby agreement could be used to: shorten testing times in the production of tactical missiles to permit greater throughput with existing equipment; speed conversion of test equipment used in production of commercial electronics products for testing of tactical missile components; and stimulate earlier production by test equipment manufacturers of additional equipment to test tactical missile components. We also analyze how a voluntary agreement among electronics manufacturers and tactical missile producers could be used to facilitate the exchange of information about tactical missile testing and to allocate testing work.

ES.4 AGREEMENTS DESIGNED TO INCREASE PRODUCTION OF WEAPONS SYSTEMS

Both standby and voluntary agreements could be used to increase production of weapons systems. We examine applications of these agreements in the construction machinery and helicopter industries. The construction machinery industry offers a difficult choice between continued production of construction equipment and conversion to production of military vehicles. Both would be important during a mobilization. Through either an educational order program or a voluntary agreement, the Government could enhance conversion capabilities and could stimulate conversion of construction machinery capacity to production of bottleneck parts and components for military vehicles.

Educational orders might also be used to stimulate increased production of helicopters. In particular, these orders could be used to support preparedness planning, standby engineering design modifications, and acquisition of standby equipment to reduce bottlenecks to substantial production increases.

ES.5 AGREEMENTS DESIGNED TO STIMULATE EARLY PRODUCTION OF INFRASTRUCTURE RESOURCES

Shortages of machine tools and critical materials would be two major impediments to substantial production increases in most industries, so a number of preparedness programs are geared towards increasing the supply of these important infrastructure resources. In this report, we analyze the applications of standby and voluntary agreements to expedite retrofitting of machine tools and reopening of mines. Standby and voluntary agreements could both serve to speed the retrofitting process through planning, the acquisition of long-lead time components (standby agreement only), and allocation of retrofitting resources (voluntary agreement only). A mine reopening could be speeded by an educational order, covering such areas as preliminary engineering/preparedness planning, completion of regulatory paperwork, and even facility maintenance and acquisition of standby equipment.

Plant space could be a third limitation on production increases. The standby agreement mechanism appears to be well suited to some types of planning for facility expansion.

ES.6 AGREEMENTS DESIGNED TO FACILITATE AN EFFICIENT ALLOCATION OF PRODUCTION RESOURCES

In the preceding summaries, we have noted several instances in which a voluntary agreement could be used to help allocate limited industrial resources efficiently and effectively. A final example of this use is examined in this report with respect to the semiconductor industry. A voluntary agreement among semiconductor companies offers a means of expediting conversion of capacity from nonessential to essential production purposes through the exchange of technical information and the allocation of work.

ES.7 AGREEMENTS DESIGNED TO IMPROVE RESPONSIVENESS OF KEY DEFENSE-SUPPORTING SECTORS

It could be feasible to use voluntary agreements to improve Government-industry cooperation to improve the competitiveness and responsiveness of defense-supporting industries that have been affected by foreign competition or changing economic circumstances. In this report, we examine possible applications of agreements in the machine tool, telecommunications, and electric transformer industries.

ES.8 CONCLUSIONS

Principal conclusions of this report are that:

- Voluntary and standby agreements show considerable potential to improve Government-industry preparedness planning and to enhance industrial preparedness

- Establishment of a viable standby and voluntary agreement program will require a substantial commitment by the Federal Government. Significant personnel resources will be required for planning, for development of agreements, and for implementation and monitoring of the agreements. Some financial investments in industry enhancement measures may also be required

- Both programs represent cost-effective means to enhance preparedness and may provide cost-effective alternatives to certain preparedness investments.

1. INTRODUCTION

This document is the third in a series of four reports in fulfillment of Contract No. EMW-84-C-1780 for the Federal Emergency Management Agency (FEMA). The purpose of this contract is to analyze applications of standby and voluntary agreements to improve industrial responsiveness. In this volume, we examine possible uses of these agreements in a number of key industrial sectors. In the two earlier volumes in this series, we reviewed and analyzed past and current uses of these agreements. (Volume 1, TR-5142-4, covers standby agreements, and Volume 2, TR-5142-5, covers voluntary agreements.) The ultimate objective of our effort is to provide a basis for policy, statutory, and administrative changes necessary to permit greater use of both types of agreements and to strengthen the federal partnership with the private sector to improve our national defense preparedness posture. Recommendations for action will be included in the fourth (and final) report in this series.

The industrial sectors examined in this third volume encompass an enormous range of business activities. They include: manufacturing and service sectors; final assembly, parts manufacturing, and raw material extraction sectors; sectors geared entirely to weapons production; and sectors important to the entire economy. The common denominator to all of these sectors is their potential importance during an emergency. We chose the particular sectors covered in this report because they provide case studies across a wide spectrum of possible applications for standby and voluntary agreements.

In the remainder of this introductory chapter, we describe the natures and purposes of standby and voluntary agreements to provide a basis for the ensuing examination of how these agreements might be applied throughout the U.S. industrial base. (For a more detailed characterization of these two types of agreements, the reader can review Volumes 1 and 2 of this series.) Following the introductory chapter, this report is divided into 14 chapters. Chapters 2 through 14 each cover one industry with the exceptions of Chapters 3 and 14, which cover two industries each. Table 1-1 outlines the topics covered in each chapter. Chapter 15 presents general conclusions.

TABLE 1-1
REPORT ORGANIZATION

Chapter	Industrial Sectors	Standby Agreements	Voluntary Agreements
Chapter 2	Tactical Missile	X	
Chapter 3	Electronics	X	X
	Electronic Test Equipment	X	
Chapter 4	Construction Machinery	X	X
Chapter 5	Helicopters	X	
Chapter 6	Semiconductors	X	X
Chapter 7	Forging	X	X
Chapter 8	Machine Tool Retrofitting	X	X
Chapter 9	Machine Tools		X
Chapter 10	Mining	X	
Chapter 11	Construction	X	X
Chapter 12	Telecommunications	X	X
Chapter 13	Financial Services		X
Chapter 14	Utilities	X	X
	Hi-Voltage Transformers	X	X

1.1 STANDBY AGREEMENTS

1.1.1 What Is a Standby Agreement?

For the purposes of this study, we define "standby agreement" to be a contractual commitment by a private firm to provide specific goods or services or to change normal operating practices at the sole option of the Government to help satisfy increased requirements for those goods and services resulting from substantially expanded peacetime military needs or from an emergency. In addition, a standby agreement program involves preparedness planning upon which the agreement is based and may also involve expenditures to enhance standby capabilities.

1.1.2 What Is the Purpose of a Standby Agreement?

The primary purpose of a standby agreement is to provide a more rapid and effective response to a military contingency or civil emergency by bringing to bear commercial and industrial resources to satisfy substantially increased requirements for goods and services. The more rapid and effective response can be achieved through several means:

- Activation of a standby agreement can eliminate the administrative lead time associated with Government contracting. The contracting process requires time to identify potential contractors, solicit proposals for the desired goods or services, prepare the proposals, judge the proposals, and negotiate a contract. This process generally takes several months or longer. While emergency conditions could cause this process to be expedited, Government and contractor administrative resources could be overburdened by the need to contract for

increases in many goods and services at the same time. This could cause delays even if procedures were streamlined. A standby agreement can be activated in hours by a simple oral, electronic, or written communication from the Government authority to the contractor. (Surge option clauses, described in Chapter 7 of TR-5142-4, are geared primarily to reducing administrative lead times.)

- Planning associated with a standby agreement can reduce or eliminate the time needed to identify emergency requirements for goods and services. However, adequate planning is not inherent in a standby agreement program, so this potential saving of time may not be realized. Nevertheless, establishment of a standby agreement might encourage a greater preparedness planning effort and might also provide more structure and discipline to the planning process. (The apparent inadequacy of planning in the Machine Tool Trigger Order Program (MTTOP) and the resulting reduction in potential effectiveness of this program are discussed in Chapter 5 of TR-5142-4.)

- Enhanced (standby) capabilities created in conjunction with a standby agreement can reduce or eliminate the time which would generally be associated with a firm's providing greater or different goods and services than normal. These enhanced capabilities might be in the form of experience (reducing learning curve delays), planning (permitting more rapid action and elimination of potential bottlenecks), and standby equipment (permitting an immediate increase in operations). (Educational orders, described in Chapter 2 of TR-5142-4, were specifically designed to create enhanced standby capabilities.)

- Finally, the planning generally found in a standby agreement program can serve as a means to orchestrate an emergency

response and, thereby, reduce the inefficiencies that might otherwise result from ad hoc emergency actions. (The Machine Tool Pool Order Program, discussed in Chapter 4 of TR-5142-4, served this purpose.)

Proponents of standby agreements have frequently seen elimination of administrative lead time as being the principal benefit of standby agreements. However, this represents only a small portion of the potential benefit of a standby agreement. Moreover, without the planning that would be associated with identification of requirements, activation procedures, and enhancement measures, a standby agreement, by itself, might have very little benefit.

Beyond providing a more rapid and effective response, a standby agreement can also provide a cost-effective alternative to some defense and preparedness expenditures. In essence, commercial and industrial resources and enhanced industrial responsiveness available through a standby agreement can obviate the emergency need for comparable Government-owned resources and end items.

For example:

- The Civil Reserve Air Fleet program allows the Government to rely on private sector air transport capability instead of purchasing more organic airlift capability
- A standby agreement to change specifications in a key bottleneck production or testing process could obtain the same increase in capacity as an investment of millions of dollars in standby production or test equipment

- Surge option clauses, trigger orders, and other standby agreements to enhance industrial responsiveness could avoid the need to invest in current inventories of end items or components.

If it established these types of standby agreements, the Government would not need to purchase and maintain some of the resources that would otherwise be required to ensure a desired level of emergency preparedness. Because these resources would be needed only during emergency situations, their purchase and maintenance by the Government would represent a very expensive form of insurance.

By relying on commercial and industrial resources to meet part of this insurance need, the Government can reduce its cost greatly. Except in cases where the government pays to enhance the private resources, the cost of a standby agreement is nominal, and even when enhancement expenditures are involved, the cost is only a small fraction of that associated with outright purchase and maintenance of comparable resources by the Government.

Because they entail relatively little cost, standby agreements can also provide greater flexibility of response. Rather than being locked into inventories of items which are likely to become obsolete, the Government can access the changing resources available in the private sector. Commercial and industrial firms who offer their resources through standby agreements generally upgrade their capabilities periodically to retain their economic and technological competitiveness. (It should be noted that changing private capabilities can reduce their potential utility in military applications. For example, domestic airlines have cut back on their long-range cargo capabilities in recent years for economic reasons. This is discussed in Chapter 6 of TR-5142-4.)

1.1.3 How Can Standby Agreements Be Used?

The programs examined in this report demonstrate a variety of uses served by standby agreements:

- Accelerate delivery of items currently in procurement
- Increase the number of items currently in procurement
- Convert capacity to production of essential items
- Modify existing civilian items for military uses
- Use commercial resources for military or other emergency purposes
- Commit to purchase items to encourage increased production in anticipation of increased industrial need for these items
- Expand capacity for essential items
- Modify product designs to facilitate production
- Modify production processes to reduce bottlenecks
- Refurbish items for military or industrial uses
- Share tooling for essential items.

1.1.4 How Are Standby Agreements Created?

There is no fixed system for creating a standby agreement. However, there are common elements to the standby agreement programs that can be combined into a standby agreement systems model. (We describe such a model in Chapter 8 of TR-5142-4.) These elements include:

- Program/funding authority
- Contracting authority
- Delegation of authority
- Requirements identification/planning
- Priorities and allocation authority
- Creation and maintenance of standby capabilities
- Program review.

The relationships among these elements are depicted in Figure 1.1-1.

Program/funding and contracting authorities are delegated to an office within an agency with procurement responsibilities. This office completes standby contracts with private firms which can provide desired goods or services.

While requirements identification and other planning are critical to an effective standby agreement program, these responsibilities have frequently received insufficient attention in creation and maintenance of such a program. Sometimes these functions are the responsibility of the contracting agency, but not always. In Figure 1.1-1, we have not tried to depict the innumerable options for allocating responsibility for these functions. The cell labeled "requirements identification" should be viewed as representing a wide variety of possibilities, ranging from a simple process where requirements are identified by the "action office" and are not reviewed outside of the parent agency to a complex process where requirements identification and other planning involve a number of agencies and also involve considerable input from industry.

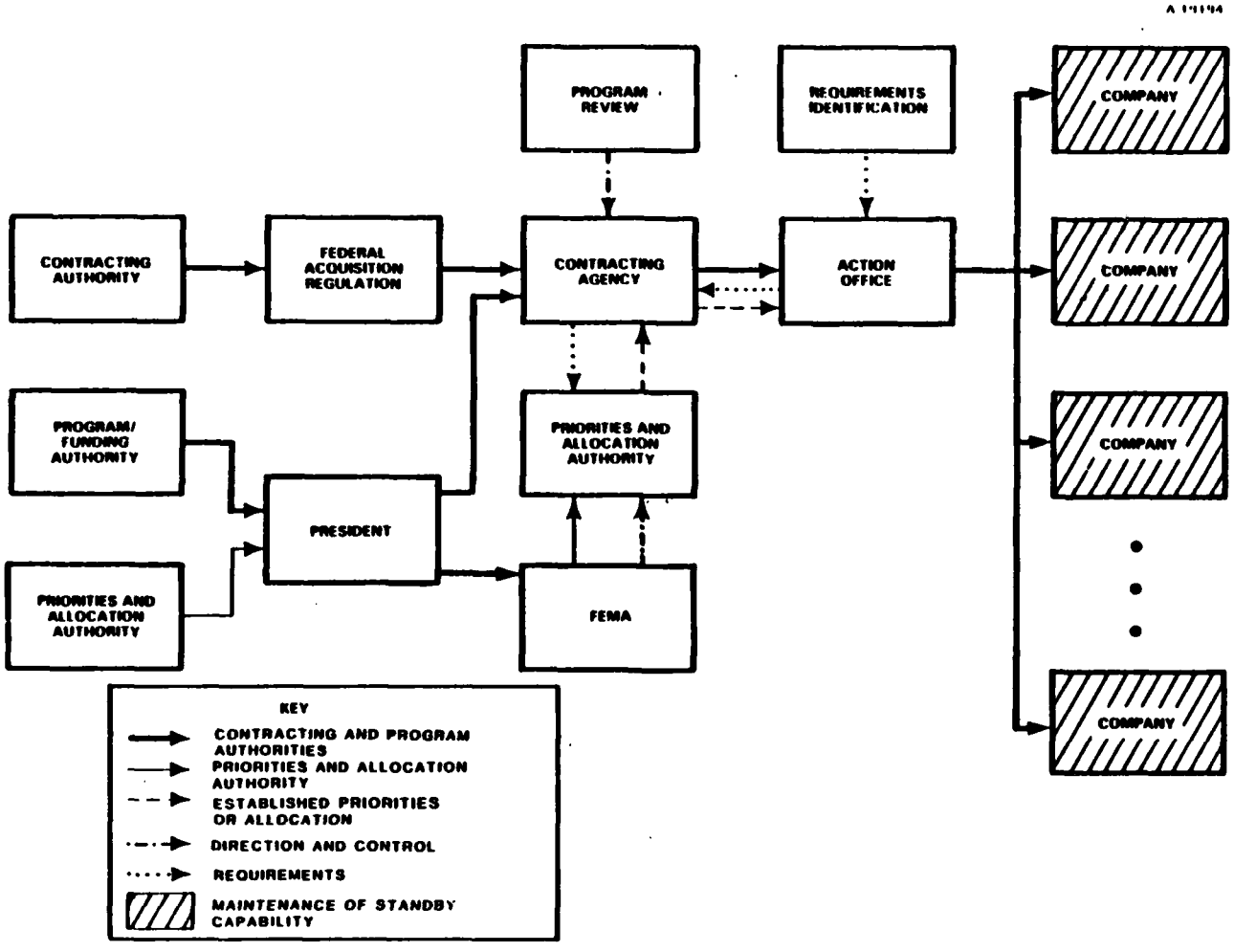

Figure 1.1-1 Establishment of a Standby Agreement Program

Priorities and allocation authorities are another important element of a standby agreement program. The agency with these authorities (redelegated from FEMA) would generally review the emergency requirements identified by the contracting agency and provide appropriate priorities or an allocation of civilian resources.

Creation and maintenance of a standby industrial capability can be an extension of the standby agreement process. Responsibility for these activities is generally shared by the Government, which funds standby equipment and production studies, and by private firms, which do some production planning and maintain some level of emergency production capabilities.

Finally, periodic program review by an existing or an ad hoc group is desirable to ensure effective use of the standby agreement mechanism. The review might be viewed as part of the ongoing planning process needed to keep a standby program current.

1.1.5 How Are Standby Agreements Funded?

Lack of funding can be a major impediment to activation of standby agreements. Simply stated, funding would not generally be available on a standby basis. In cases where appropriated funds for given goods and services were not fully obligated, the unobligated amount could be used to provide stopgap funding. For example, a Civil Reserve Air Fleet (CRAF) activation could be funded initially in this manner. However, additional funds would eventually have to be reprogrammed or appropriated in such cases to sustain the increased effort triggered by the standby agreement.

In cases where given goods and services are not currently being purchased by the Government, a special appropriation (and perhaps even an authorization) might be required before the agreement could be activated. For example, activation of MTTOP contracts could require prior authorization (or review) and funding by Congress.

The delay in activating a standby agreement resulting from the need for congressional funding action could reduce or even eliminate the effectiveness of the standby agreement mechanism. It should be noted, however, that this delay is not inherent in the concept of a standby agreement. It is possible for Congress to provide a (standby) contingent authorization and appropriation to permit activation of a standby agreement without further congressional action.

Funding for enhanced standby capabilities within a standby agreement program has also been a problem historically. As discussed in Chapters 2 and 6 of TR-5142-4, Congress proved reluctant to fund educational orders and enhanced CRAF aircraft. These programs were plagued by negative perceptions of industrial preparedness expenditures and concerns about Government subsidies to industries.

1.1.6 How Are Standby Agreements Triggered?

The saving of time in acquiring needed goods and services is the foundation underlying the standby agreement concept. Therefore, timely activation of a standby agreement is key to its effectiveness in an emergency. Ironically, programs which encompass standby agreements frequently involve inadequate planning about the conditions under which these agreements should be triggered. This failure reduces the potential value of these agreements substantially.

In cases where a standby agreement concerns manufactured goods, the desired increase in output would generally take weeks or even months from the time of triggering. In such cases, standby agreements would be far more effective if they were triggered earlier in anticipation of increased requirements rather than later in response to actual need.

In cases where the standby agreement concerns a service industry, this may be less of a problem because triggering the agreement can often achieve a more rapid result. For example, CRAF aircraft can be fulfilling military airlift requirements within hours of activation.

The added benefit from early triggering is not without cost, since greater risk is associated with expenditures in anticipation of requirements rather than in response to actual requirements. If some or all of the anticipated requirements do not come to fruition, the Government may wind up with unneeded items.

1.1.7 How Effective Is the Standby Agreement Mechanism?

Our examination in TR-5142-4 of six programs that involve standby agreements or elements of standby agreements leads us to the following conclusions:

- The standby agreement mechanism offers an effective and efficient means to augment existing Government resources with those of the private sector during an emergency
- The mere existence of a standby agreement does not ensure its effectiveness in improving mobilization capabilities

- An effective standby agreement program requires preparedness planning (by Government and industry) and a process which ensures timely activation in anticipation of or response to emergency requirements

- Standby agreement programs have received little attention and planning resources, unless they have been clearly perceived as being important and cost-effective elements of our national security structure. In the past, this perception has been a function of how immediately and substantially private resources governed by a standby agreement could be applied to defense purposes

- The effective future use of standby agreements to improve industrial responsiveness will be largely contingent on an increased awareness that such responsiveness is important to our national security and that industrial preparedness expenditures are cost-effective.

1.2 VOLUNTARY AGREEMENTS

1.2.1 What Is a Voluntary Agreement?

Because the concept of a voluntary agreement is prescribed by law, it does not pose the definitional problem associated with standby agreements. There is no problem determining whether a past or present voluntary agreement fits within a strict definition of the term, because the nature of a voluntary agreement is spelled out in Section 708 of the Defense Production Act.

Nevertheless, it is useful to present a concise definition of a voluntary agreement. For the purpose of this study, we have defined a "voluntary agreement" to be:

> A voluntary association of two or more companies, granted relief from antitrust laws under procedures defined in Section 708 of the Defense Production Act of 1950, to engage in specified activities in support of defense preparedness or mobilization programs, that would pose an unacceptable risk of violation of the antitrust laws if carried on outside the procedures of Section 708.

The key elements of this definition are discussed below.

DPA Section 708 Procedures - Section 708 of the DPA allows federal agencies that have been delegated Presidential authorities to form voluntary agreements if they find that "conditions exist which may pose a direct threat to the national defense or its preparedness programs." While the agency must explain the basis for this conclusion in its proposal to establish an agreement, no other agency has authority to question the finding.

The DPA also defines procedural requirements for establishing a voluntary agreement, including requirements for consultation with the Department of Justice and Federal Trade Commission, public notice of meetings, and recordkeeping. (The step-by-step process to establish a voluntary agreement is described in Chapter 7 of Volume 2 of this series.)

Support of Defense Preparedness - Under the terms of Section 708, voluntary agreements may be established "to help provide for the defense of the United States through the development of preparedness programs and the expansion of productive capacity and supply beyond levels needed to meet essential civilian demand in the United States." While a direct connection to defense preparedness is necessary, the permitted scope of a voluntary agreement is fairly broad as long as it achieves this objective.

Relief from Antitrust Laws - After the sponsor has developed and approved the voluntary agreement, he is required to certify that the agreement is necessary to carry out the purpose of the DPA and to submit it to the Attorney General for an antitrust review. Although the Justice Department is not authorized to question the purpose of or need for the agreement, it may find that the purposes could be accomplished either with an agreement having a lesser anticompetitive impact or without an agreement.

Once the agreement is approved, participants are protected from antitrust charges for actions they take to carry out the agreement. Until the most recent DPA amendments (in 1975), participants received immunity from antitrust charges; now the DPA provides participants with a defense against such charges as long as the participant can show that he operated in good faith and in full compliance with the requirements of the DPA. Although this protection is not as complete as the DPA formerly provided, it is probably sufficient protection for participants in voluntary agreements. At a minimum, it would make it extremely difficult to prosecute successfully and therefore would greatly reduce the risk of charges being brought.

Risk of Violation of Antitrust Laws - By definition, a voluntary agreement is a collective activity of business firms in support of defense preparedness. However, not all collective activities in support of national defense are voluntary agreements. Because the Attorney General can reject a voluntary agreement on the basis that the objective could be accomplished without one (i.e., without antitrust protection), no purpose is served by proposing a voluntary agreement unless the proposed activity would increase the risk of antitrust prosecution for participants.

Participants in voluntary agreements would be most likely to infringe on the provisions of the Sherman Act prohibiting "combinations and conspiracies in restraint of trade." Many of the activities that past voluntary agreements performed -- e.g., allocating business among subcontractors -- would probably be clearcut violations of the antitrust laws. It might be more difficult to assess the risk of other activities, especially because the antitrust laws and court interpretations are fairly subjective.

Besides granting relief from the threat of antitrust prosecution, establishment of a voluntary agreement also involves creating a Government-industry partnership to resolve a critical problem affecting national security. The voluntary agreements program is the principal organizational legacy of past emergencies, when industry and Government worked together effectively to solve problems that inhibited defense production and mobilization preparedness. (These past programs are discussed in Chapter 2 of Volume 2 of this series.) Establishing a voluntary agreement involves common agreement between the Government and an affected industry that a serious national security problem exists. It also represents agreement as to the objective of the joint industry-Government effort and mutual commitment to resolve the problem.

1.2.2 How Can Voluntary Agreements Be Used?

As was the case with standby agreements, the primary purpose of a voluntary agreement is to provide a more effective response to an emergency by bringing to bear commercial and industrial resources, or to help industry prepare to meet emergency requirements. Relief from the risk of antitrust prosecution can encourage more effective cooperation to identify and resolve problems.

TR-5142-5 examines two distinct past uses of voluntary agreements. The first type, related to production of defense materiel, involved contractors and subcontractors working on a specific weapons program (e.g., military trucks, cast armor, small arms ammunition). Those sponsored by the Army were called "integration committees," while the Air Force sponsored "production committees." This type of agreement was used to improve industrial responsiveness by helping to solve production problems. They carried out some or all of the following functions:

- Facilitating the conversion of new producers by permitting a free exchange of production experience, data, drawings, etc.
- Standardizing components or production processes among different producers of the same item, either by the exchange of information or by agreement among the participants as to standard techniques and processes
- Alleviating component and materials shortages by sharing order boards, scheduling information, and supplies of parts, components, or materials
- Improving the scheduling of production by allowing contractors working on the same or similar items to coordinate their orders and deliveries
- Permitting manufacturers to allocate subcontracts, pool orders for materials, etc.

All of these methods resulted in improved responsiveness. Coordinating production maximized the individual capabilities of production facilities. (This technique can also be applied to sectors providing services to the Department of

Defense. For instance, an integration committee of companies providing aircraft maintenance services was formed in the mid-1950s, with the same general thrust as production-oriented integration committees.)

It is more difficult to generalize about the uses of the second type of voluntary agreement, because each of these agreements was unique. During the Korean conflict, the Attorney General approved a number of "miscellaneous" agreements made up of nondefense producers. Some of these agreements were very similar to standby agreements such as those discussed in our standby agreement report. For instance, warehousemen's associations in three major metropolitan areas formed agreements to ensure that storage facilities would be available to military shipments. Similarly, oil tanker operators established a voluntary agreement (which remains in effect) to coordinate provision of tanker capacity for defense shipments. (This agreement is discussed in Section 4.6 of TR-5142-5.) The principal distinction between these types of voluntary agreements and the "pure" standby agreements appears to be the joint nature of the commitment. Whereas the standby agreement represents a unilateral agreement by a company to provide a specified product or service, these voluntary agreements represented collective agreements to make the specified type of service available.

A second group of "miscellaneous" agreements allowed industries to exercise voluntary economic controls. For instance, steel producers formed a voluntary agreement to coordinate steel pricing. Under the agreement, they agreed not to raise prices for certain types of steel without providing minimum notice to the Government. Similarly, major lending institutions established a committee to provide guidance on credit policy in order to discourage nonessential

lending, channel capital toward defense-essential producers and expansion projects, and restrain hoarding and excessive inventory growth. (This agreement is discussed in Section 4.2 of TR-5142-5.)

These past uses give perspective into potential uses of voluntary agreements. Collective action by companies in an industry or service sector may support a broad range of preparedness goals, such as:

- Coordinating expansion of facilities, conversion of new producers, and scheduling of production to minimize production bottlenecks and to improve the utilization of current production capacity
- Providing for timely and coordinated delivery of services from transportation, maintenance, and other service sectors
- Supporting preparedness goals through implementation of voluntary economic restraint programs
- Allocating civilian resources to defense applications and reallocating remaining resources for civilian use.

1.2.3 When Can Voluntary Agreements Be Used?

Under the terms of the Defense Production Act, voluntary agreements can be used at virtually any time as long as they have the general purpose of improving industrial preparedness. Although voluntary agreements have traditionally been used mainly in wartime, there is no legal restraint on using the authority in peacetime to improve preparedness. In fact, Section 708 of the DPA was specifically amended in 1975 to permit use of voluntary agreements as peacetime instruments

to maintain preparedness. However, their use must be limited to solution of serious national security problems. A number of applications for voluntary agreements are described below.

Use of Voluntary Agreements During Mobilization - During mobilization, agreements might be needed for most critical weapons programs as well as for individual components or materials. Especially during the initial stages of mobilization, voluntary agreements could help support military deployment, coordinate conversion of new producers, and harmonize production. Similarly, agreements to provide essential services or voluntary economic controls might be activated during mobilization. In this situation, the use of voluntary agreements would most closely approach the World War II experience (discussed in Section 2.2 of TR-5142-5.)

Use of Voluntary Agreements During Surge - There are many reasons why the United States might decide to surge production on either an across-the-board basis or for selected systems, individual munitions, spare parts, or components. Surge production could be ordered in anticipation of conflict, to maintain readiness during an "operational surge," to resupply an ally during or immediately after a local conflict, to support limited conflict by U.S. forces, or to respond to rapid changes in technology or the international environment. Voluntary agreements could improve surge responsiveness by helping convert and qualify new producers, harmonize production schedules, coordinate delivery of parts and materials to multiple prime contractors, or coordinate support by infrastructure industries.

Two of the agreements examined in Volume 2 were used to support "surge" production. In the early 1950s, deteriorating world events suggested the need for a rapid changeover to

the B-47 bomber. Instead of confining production increases to Korean conflict requirements, the United States took preparatory actions for a wider, general conflict. In order to accelerate B-47 deliveries, two new producers were established, and the B-47 Production Committee helped them attain rapid production capabilities. Similarly, the Berlin Crisis and Cuban Missile Crisis in the early 1960s led to a decision to accelerate the changeover from the M-1 to the M-14 rifle. A third producer was brought into the program, and the M-14 Integration Committee helped this firm attain a more rapid production capability.

Other "surge" conditions that might benefit from voluntary agreements include:

- Qualifying new producers, coordinating production schedules, and conducting other activities to resolve shortages of a critical component or assembly in a case such as the tank turret casting shortage caused by surge production to replace Israeli Yom Kippur War tank losses in 1973
- Maintaining and repairing aircraft and ships during a U.S. force deployment
- Producing and delivering spare parts and munitions during a "readiness surge" or limited conflict
- Establishing standards for relaxing test requirements or solving other production bottlenecks that prevent a surge of air-to-air missiles or other munitions
- Increasing production of cruise missiles or other strategic programs rapidly to respond to a world crisis or "SALT breakout."

Voluntary agreements might serve an important purpose as the "bridge" between surge and mobilization. It has been noted that surging production will not necessarily prepare industry for subsequent mobilization because surge is based on maximizing the utilization of current capacity. Whereas surge consumes resources, mobilization requires the creation or conversion of new resources. By itself, surge does not provide for either expansion of capacity or conversion of new producers, either or both of which would be needed in order to increase production beyond the limited additional quantities surge can provide. Surge confronts the mobilization planner with a dilemma: preparing to mobilize could reduce near-term output by demanding resources that could otherwise be applied to surge, but, on the other hand, surging without preparing to mobilize could use up valuable time that could otherwise be used to prepare for the much larger subsequent production increases. Use of voluntary agreements could provide for the coordination that is otherwise lacking by improving near-term coordination, facilitating the activation of new subcontractors and producers, and identifying and solving production bottlenecks. Creating and activating voluntary agreements during surge could be important steps in improving preparedness.

Use of Voluntary Agreements to Avert Disruption - Unexpected events such as strikes, sabotage, interruption of foreign sources, and natural disasters could disrupt production of military end items or components. Disrupted production at a single key component or subassembly plant could affect production of an entire system or, in some cases, many different systems. Voluntary agreements could be used to work around these problems by coordinating production schedules at plants producing similar items, scheduling deliveries, helping qualify new producers, or, in the case of sabotage or natural disaster,

providing technical assistance to restore production at the damaged plant. Among nonproducers, voluntary agreements could help coordinate restoration of utility services, reconstruction of transportation facilities, or prioritization of limited transportation, utility, or financial services.

Use of Voluntary Agreements to Alleviate Peacetime Bottlenecks - In the late 1970s, lead times for many defense systems increased sharply as military and commercial aerospace demand peaked simultaneously. Commonly cited capacity shortages included forgings, castings, titanium, bearings, and connectors. Because of personnel limitations and the natural reluctance of Government to enforce defense priorities strongly in peacetime, the existing Special Priorities Assistance program can have only a limited impact, and a large number of simultaneous bottleneck problems could overload the system. Voluntary agreements might be used as a way to let industry and Government jointly address peacetime bottlenecks. Voluntary agreements could be used to coordinate prime contractor demand, coordinate bottleneck industry production schedules and deliveries, or integrate production within the bottleneck industries to increase deliveries.

Use of Voluntary Agreements to Improve the Responsiveness of the Mobilization Base - Voluntary agreements could be used to facilitate preparedness planning by defense-supporting industries or to improve the responsiveness of industries impacted by foreign competition or changing economic conditions. A voluntary agreement could permit a key defense-supporting industry to develop long-range R&D, production, or marketing strategies to improve its economic condition and preparedness posture. Some of these applications would be extremely sensitive, especially during peacetime, and it would be necessary to structure such an agreement carefully.

Establishment of Standby Voluntary Agreements - Although the concept of a standby voluntary agreement (i.e., one that is established and approved, but not activated) is not mentioned in the DPA, it could be an important way to improve preparedness. Because of the substantial administrative lead time to establish voluntary agreements, it might not be possible to use them in a rapidly-developing emergency unless the agreement were established in advance. Even in cases where a voluntary agreement would not be needed in peacetime, creation of a standby voluntary agreement might enhance the industry's emergency preparedness.

With the administrative paperwork out of the way, the purpose and activation procedures defined, and members appointed, a committee could be activated immediately in response to an emergency. (The Foreign Petroleum Supply Committee, discussed in Section 4.4 of Volume 2, provides an example of a voluntary agreement that was relatively inactive during normal situations but able to respond immediately during emergencies.)

1.3 REPORT METHODOLOGY AND PURPOSE

The first two volumes of our study of standby and voluntary agreements represent definitive analyses of the issues surrounding these agreements -- their natures; their purposes; their possible uses; their creation, maintenance, and activation; and their benefits and costs. In this volume, we provide preliminary analyses, or think pieces, on additional applications for these agreements.

These preliminary analyses are not intended to support decisions on specific implementation of these authorities. Instead, the chapters that follow are intended to present a general concept of how these authorities might be used to address a wide range of peacetime and emergency preparedness problems. This approach is consistent with the general purpose of this project, which is to determine whether these authorities should be implemented more widely and to suggest how they might be implemented. Considerably more analysis and staff effort would be required to support preparation of actual agreements.

A number of these analyses have drawn on our pre-existing understanding of industry characteristics and responsiveness problems developed through previous analytic efforts. We have augmented this understanding through review of additional relevant documents on the sectors covered and interviews with industry representatives.

In selecting industries to review, we tried to select a broad range of manufacturing and service sectors. We also attempted to choose industries that would allow us to consider a broad range of agreements. No effort was made to select those industries that would be most likely candidates for agreements or to define the types of agreements that would make the greatest improvements in industrial responsiveness.

In an effort to avoid repetition and consider a broad range of uses, we have not necessarily described all the ways agreements could be used in each industry. Some chapters -- such as the chapter on tactical missile production -- concentrated on describing possible solutions to only a single serious problem.

One type of agreement not considered extensively in this report is the traditional integration committee approach first used in World War II. (See Chapter 2 of Volume 2.) In both World War II and the Korean emergency, integration committees were established for many weapons programs to help coordinate conversion and resolve production bottlenecks. To the greatest extent possible, these committees tried to integrate the activities of all firms supporting a weapons program into a single structure. This allowed the prime and subcontractors to orchestrate their efforts, resolve capacity shortfalls, and maximize output from existing facilities. It also allowed new producers of defense materiel to benefit from the experience of existing producers.

The benefits of integration committees when defense requirements increase suddenly and substantially have been well documented. The official War Department history of the World War II Ordnance Department described them as "among the most successful devices Ordnance developed to break bottlenecks, speed production, and promote cooperation among contractors."* In his memoirs, Lt. Gen. Leven H. Campbell, World War II Ordnance Commander, stated that "Ordnance could not have met its constantly changing requirements without the extreme flexibility afforded by this grouping of contractors. Specifically, the various integration committees made it possible to turn out thousands of units above and beyond individually rated plant capacities."+ DoD would be likely to

*Thompson, Harry C. and Mayo, Lida, The Ordnance Department: Procurement and Supply, Office of the Chief of Military History, Washington, 1960, p. 471.

+Campbell, Lt Gen Levin H., The Industry-Ordnance Team, Whittlesey House, New York, 1946, pp. 117-118.

rely heavily on these types of committees in any future emergency when requirements increased suddenly. Of the industries examined in this report, both tactical missiles and helicopters would represent likely candidates for integration committees. These committees might be formed for individual systems -- e.g., the Sidewinder missile -- or for groups of similar systems. In all cases, the purposes would be similar:

- To help convert new prime contractors and suppliers
- To help coordinate production requirements imposed by prime contractors on lower-tier producers
- To identify and resolve production bottlenecks
- To make recommendations to the Government authorities for decisions on priorities and production problems.

Because each of these integration committees would be similar in scope and intent, we have not described the likely operations or benefits in the chapters on individual industries. Nevertheless, the potential benefits of applying these time-tested techniques are substantial, and should be pursued by the Government.

2. TACTICAL MISSILES

2.1 INTRODUCTION

Recent studies have identified a number of bottlenecks to increased production of tactical missiles. The most commonly identified bottlenecks include parts and components inventories and special tooling and test equipment (ST/STE). In this section, we examine the potential impact of a standby agreement to reduce or eliminate the bottleneck in the latter area -- special tooling and test equipment.

The idea is to create a standby agreement between the DoD procuring authority and the tactical missile producer to reduce testing requirements to permit more ST/STE throughput during an emergency or when missile requirements otherwise increase rapidly. If the required testing time at a given point in the production of a tactical missile were cut in half, for example, twice as many items could be tested within a given time frame using a fixed amount of ST/STE.

While it could lead to greater output in less time and at reduced cost, the relaxation of testing requirements could also result in lower overall product reliability. The implications of such reduced reliability and the other potential costs and benefits associated with a standby agreement to reduce testing requirements are examined in this chapter.

2.2 TESTING AND TEST EQUIPMENT

Tactical missile production facilities are generally sized to operate on a modified one-shift basis to meet anticipated (peacetime) defense requirements. While sufficient equipment and tooling exists for most steps of the production process to accommodate production needs within a 40-hour workweek, less equipment and tooling is acquired for testing procedures. As a result, special equipment and tooling for testing are frequently operated many more hours per week than production equipment and tooling.

In the event a substantial production increase were desired, it would be possible to double or even triple throughput in the production steps by adding additional shifts, but a comparable increase in the testing steps would be impossible under current procedures because testing capacity is already being utilized on a two- or three-shift basis. Thus, special testing equipment and tooling form a bottleneck to increased increased tactical missile production.

The disparity between capacity utilization in the missile production and testing stages is demonstrated by data available in the USAF 1984 Production Base Analysis. A survey concerning production of nine different missiles revealed production capacity utilization ranging from 60 to 200 percent based on one-shift operations (or 20 to 60 percent based on three shifts) and support/test capacity utilization ranging from 120 to 300 percent based on one-shift operations. All producers surveyed reported that at least some test stations were being utilized on a three-shift basis.

In such areas where equipment and tooling are heavily or completely utilized during normal operations, two methods for increasing throughput exist:

- Increase the amount of equipment and tooling (and associated manpower)
- Decrease the amount of time required to process an item through each testing stage.

The former method -- increasing the amount of equipment and tooling -- could entail considerable cost. The "Blueprint for Tomorrow" recommends that $100 to $200 million be invested in additional test equipment to balance capacity for the tactical missile facilities covered by that report. Alternatively, it might be possible to reduce the need for additional test equipment by planning to convert some test capacity from civilian to military production or to expedite production of needed test equipment during an emergency. (Standby agreements for such purposes are examined in Chapter 3 of this report.)

Decreasing processing time could be achieved by reducing testing requirements. It would be possible to test items more quickly and, therefore, to test more items with existing equipment within a given time frame. Unfortunately, reducing test requirements could have implications for product reliability. The tradeoff between increased ST/STE throughput and missile reliability is discussed in Section 2.4.

2.3 STANDBY AGREEMENT

A basic standby agreement to reduce testing requirements could be modelled after the production surge option-to-increase-quantities clause described in TASC report TR-5142-4 (Volume 1 of this series). With the production surge option clause in an existing contract, a contracting officer may accelerate delivery and/or increase the amount of goods ordered through the contract by simply notifying a contractor. Similarly, a testing specifications surge option clause could permit a contracting officer to reduce or waive testing requirements that would otherwise delay needed missile output. Limitations on the option to relax or waive testing specifications could be spelled out in a testing specifications surge plan required by the contract. Such a plan could be based on testing data accumulated in the normal course of missile production.

In addition to covering testing specifications, the option clause could address changes in price and warranty. Reducing testing time would probably reduce production costs but might also pose a higher product failure risk against which it might be necessary or desirable to indemnify the contractor. As in the case of the production surge option clause, the price and warranty issues could be handled by stipulating, in the order activating the standby agreement, limitations on the Government's financial liability and contractor indemnification. The clause could provide for subsequent resolution of these issues between the Government and the contractor.

Finally, the option clause could also include triggering restrictions to protect against unwarranted and disruptive use by a contracting officer. For example, the clause could

require findings by a higher DoD authority that an emergency exists and that extraordinary measures are necessary and desirable to increase tactical missile production.

Like the production surge option, an option to relax or waive testing specifications for defense items would be a relatively simple program to administer. All responsibilities for the program would rest with DoD entities (unless another agency is somehow involved in the procurement). Funding the activated agreement would not be a stumbling block since item costs would generally decrease, rather than increase, as testing requirements are reduced. (However, this reduction in cost might be partially offset by increased warranty payments, unless the manufacturer is indemnified against additional system problems possibly resulting from the reduced testing requirements).

2.4 BENEFITS AND COSTS

A standby agreement to reduce tactical missile testing requirements could result in a variety of benefits and costs. These are described below.

2.4.1 Reduced Lead Times

A key benefit resulting from a standby agreement should be quicker implementation of a desired action. In the case of tactical missile testing requirements, calculations about the initial administrative time saved by a standby agreement can vary over an enormous range in accordance with the underlying assumptions. If normal peacetime procedures are in force, the time to initiate and implement a change in production specifications would generally range from three to

six months. This time would include formulation of a change proposal by the contractor, review of the proposal by Government personnel, and negotiations between the contractor and the Government. In an emergency, engineering change procedures might be shortened dramatically. In an extreme situation, a change could be agreed to almost immediately with the understanding that contracting details would be worked out after the change has already been implemented. A standby agreement could save considerable processing time in the first case by eliminating the initial three- to six-month delay and virtually no time in the second case.

However, even if the process of approving specification changes were accelerated, it would still be necessary to identify those specifications whose relaxation would increase test capacity the most and reduce product performance or quality the least. The greatest potential for administrative lead time reductions as a result of standby agreements might be in the time required to identify specification changes.

Moreover, standby agreements could also reduce the administrative overload that would be likely to occur during an emergency. This overload could delay decisions even in cases when normal administrative procedures have been reduced greatly or eliminated. By simplifying the initial decision process, a standby agreement could reduce the possibility of such a delay.

In-process time would also be shortened by reducing the testing increment. This could shorten the lead time between order and delivery of tactical missiles. While the reduction of testing time is not dependent on the existence of a standby agreement, the existence of a standby agreement and the preparedness planning associated with such an agreement

would raise the probability that the option to reduce testing requirements would be implemented during a time of need.

2.4.2 Reduced Bottlenecks

As discussed previously, ST/STE are common bottlenecks to significant increases in tactical missile production. Reducing testing requirements could reduce or eliminate these bottlenecks immediately. Alternatively, the ST/STE bottlenecks could be mitigated by the acquisition of additional tooling and equipment, but this would take time -- generally, over a year during peacetime and, perhaps, even longer during an emergency depending on demand, capacity, and priorities. Equally important, the reduction in demand for ST/STE and for the technical personnel to operate ST/STE stations could free up scarce resources needed to satisfy other emergency needs. Again, a standby agreement is not integral to reducing ST/STE requirements, but it would undoubtedly facilitate this possibility.

2.4.3 Reduced Program Costs

The extra costs associated with a standby agreement to relax testing specifications would be small in relation to the potential benefits. The option clause could be included as a standard contract clause and would not require extra procurement activity. The planning tied to the option clause would draw on testing data maintained by a contractor during the production process and would probably require little additional analysis beyond that which a contractor conducts in the normal course of operations.

Considerable potential cost savings could result from reducing the need for ST/STE. The "Blueprint for Tomorrow"

estimates an investment cost of $100 million to $200 million for special tooling and test equipment to reduce current missile capacity utilization rates to a one-shift basis. In other words, it would cost $100 million to $200 million to create a standby capability to triple testing throughput. The potential need for some portion of this standby capability could be eliminated by a series of standby agreements to relax testing specifications during a surge or mobilization contingency.

In the event that production were surged, missile acquisition costs would be reduced in accordance with the reduced requirement for testing manpower and equipment for production of each missile.

2.4.4 Reduced Product Reliability

Testing is used to eliminate defective components, to cull out components that might fail under adverse environmental conditions, and to identify production runs with an unacceptably high rate of failure. By reducing testing, one runs the risk of increasing the incidence of tactical missile mission failures. A slight increase in failures (or the potential of failure) might be acceptable and desirable in exchange for a substantial increase in missiles available for use during an emergency. For example, would a commander in an emergency situation prefer to have 50 missiles which are 90 percent reliable or 25 missiles which are 95 percent reliable? This type of tradeoff lies at the heart of decisions to create and to activate a standby agreement to relax testing specifications and to speed output of needed missiles.

However, not all relaxations of test specifications would have an impact on product reliability or performance.

Some testing is intended to ensure that a product will have a long shelf life, while other testing ensures performance in extreme climates or conditions (e.g., extreme cold and heat). While this type of testing is justified in peacetime, some of it may be dispensable in a crisis when end items are more likely to be used immediately and when multiclimate testing may not be needed.

Discussions with tactical missile producers suggest that at least some forms of testing could be reduced substantially while increasing the potential for system failure only marginally. For example, in an instance where testing data indicate that 99 percent of component failures are identified during the first half of the testing period, throughput could be doubled by cutting the testing time in half while risking a relatively small increase in defective components. Again, the tradeoff decision comes down to the increased risk of missile failure versus the overall increase in missiles produced.

The planning necessary to identify these tradeoffs would be the principal benefit of the standby agreement. During an emergency, relaxing test specifications might be one of very few means to obtain immediate production increases. The pressure of events at that time might make it very difficult to make the necessary judgments; in any event, increased production would be delayed by the time required to identify and implement the changes. Preparing the standby agreement in advance would save this time and provide an added measure of assurance to industrial responsiveness planners.

2.4.5 Cost-Benefit Summary

A standby agreement to reduce testing requirements during production of a tactical missile entails considerable

potential benefits in terms of increased industrial responsiveness and reduced production costs. During a national security emergency, these potential benefits may well outweigh the potential cost in reduced missile reliability.

Another cost of the agreement would be the engineering analysis and planning time required to identify specifications that can be changed and to make the necessary production/performance tradeoffs. However, this might be a very modest expense relative to the financial cost of purchasing additional test equipment if the standby agreement could provide equivalent increases in test capacity.

2.5 POLITICAL CONSIDERATIONS

As with any proposed preparedness initiative, the viability of a standby agreement program to relax testing specifications for tactical missiles during a national security emergency depends, in large part, on the acceptability and advocacy of this option within the Military Services. Traditionally, there has been an understandable reluctance to engage in preparedness planning that involved downgrading equipment specifications in exchange for greater emergency production capability. Some people fear that such planning could lead to downgrading not only in emergency situations, but during peacetime acquisition as well. The key to raising the acceptability and advocacy of this option would be hard data quantifying the relative costs and benefits measured in terms of reduced mission reliability versus increased production and reduced cost.

3. ELECTRONICS AND ELECTRONIC TEST EQUIPMENT

3.1 INTRODUCTION

Electronic test equipment is commonly recognized as a major bottleneck to substantially increased defense production. Because electronic components and assemblies often require many hours of continuous testing to ensure reliability and durability, test equipment is frequently in use around the clock. In such cases, there is little room for increased throughput in the testing area without reducing testing time or increasing testing equipment. A standby agreement program to deal with the former -- reducing testing time -- was addressed in Chapter 2.

Two other standby agreement programs could be created to increase the amount of equipment available for testing defense products. The first would involve conversion of test equipment from commercial to military production. Electronics manufacturers with convertible equipment and expertise might be awarded educational order contracts for production* and testing or testing, alone, of defense items for which substantially increased output would be blocked by existing test equipment bottlenecks. The educational order contract would cover acquisition of any special equipment and tooling needed to augment the commercial electronics producer's existing

*In some cases, production and testing may be so intertwined that some production activities, as well as testing activities, should be carried out by the commercial production facilities.

capabilities, a minimal amount of "education" carrying out the functions that would be required by the standby agreement, and compliance with new contractor qualification procedures and paperwork requirements.

The second standby agreement program would be similar to the current Machine Tool Trigger Order Program. In a Test Equipment Trigger Order Program (TETOP), the Government and test equipment producers would contract on a standby basis to increase production of needed test equipment and tooling. The Government would be responsible for triggering the contracts and purchasing the equipment not otherwise sold to private firms, and the equipment producers would be responsible for maintaining capacity to produce the amounts and types of equipment covered by each contract.

In addition to these two standby agreement programs, a voluntary agreement involving both defense and commercial electronics manufacturers could serve as a means of transferring technical information needed to convert from commercial to defense work. Such an agreement could provide, for example, a ready mechanism for transferring information needed for educational orders. It could also serve as a means of exchanging information about production bottlenecks and capacity available to relieve those bottlenecks.

In this chapter, we examine how the different standby agreement programs and a voluntary agreement could be applied to help reduce or eliminate potential test equipment bottlenecks. Since each type of agreement program approaches the potential bottleneck problem differently, they are not mutually exclusive options and could, in fact, increase each other's impact if implemented in parallel.

3.2 PRODUCTION OF TEST EQUIPMENT

In Section 2.2, we described why testing processes are frequently bottlenecks to substantially increased production of tactical missiles. Testing equipment and tooling are more heavily utilized than production equipment and tooling during normal operations, so there is less room to increase throughput in the testing area. Adding test equipment and tooling so the utilization rates in the testing and production areas are equal is one way to eliminate this "built-in" bottleneck, but this is an expensive solution. The purpose of a standby agreement would be to defer much of this expense until national security conditions indicate a probable need for substantially increased output.

The problem with deferring procurement of needed test equipment and tooling is the delay between order and delivery. For the types of specialized and expensive equipment and tooling that frequently constitute the bottlenecks, this delay could easily exceed one year. The long delay results from the fact that the equipment and tooling are so specialized and complex. These items are not produced for inventory and, therefore, cannot be purchased "off the shelf." They are produced "to order." In other words, the process leading to the production of special test equipment and tooling does not begin until a buyer has been specifically identified. The production process can then be drawn out by the delays in acquiring needed parts and components and in scheduling production. These delays are particularly pronounced for low-quantity orders, because manufacturers are reluctant to disrupt their production schedules to produce special parts and components to satisfy such orders.

Actual use of new test equipment and tooling is frequently delayed even further after delivery to the buyer. because in some cases (e.g., tactical missile producers), the buyer is the final assembler of testing components and subassemblies acquired from a number of sources. This final assembly process, combined with an installation and shakedown period, can require another several months.

These delays could be reduced greatly, if existing equipment and tooling were available on a standby basis. Conversion of existing equipment and tooling used for nonessential commercial electronics production might be one means of obtaining use of existing capabilities. However, such equipment and tooling could not be converted quickly and effectively unless the full complement of equipment and tooling needed for defense production is in place. If not, obtaining additional specialized equipment and tooling for defense production to augment existing commercial production capabilities could entail delays as long as those involved in acquiring an entire set of needed equipment and tooling. Delays in learning how to test a military product could also reduce the value of converting civilian production capabilities. Often, military and civilian production experience within the same industry are different and not easily convertible without prior training. Educational orders would be one means of obtaining that prior training, and a voluntary agreement would be a means of transfering technical knowledge from defense producers to additional manufacturers to help the latter convert to defense production more quickly.

Creating standby testing capacity would be another means of reducing the delays associated with obtaining extra equipment and tooling. As previously mentioned, creation of standby capacity is an expensive option. However, a program

that stimulated production of needed equipment and tooling in anticipation of growing need could lead to earlier availability of needed capacity. This is the idea behind a trigger order program for test equipment.

3.3 AGREEMENTS

Two standby agreement programs and one voluntary agreement program could be used to increase needed testing capability. The first standby agreement program would involve conversion of electronics production/testing capacity from commercial to military products. With or without such a program, a voluntary agreement could be used to speed conversion by facilitating the transfer of technical information. The second standby agreement program would involve Government purchase commitments to stimulate earlier production of test equiment in anticipation of a defense production surge.

The first program could be modelled after the educational order program, which was active from 1939 to 1941. The purposes of this program were to augment existing commercial production capacity with additional (standby) equipment and tooling needed to produce defense items, to have commercial firms plan how to convert to defense production, and to educate commercial firms about production of specific defense items. (The educational order program is examined in detail in TASC report TR-5142-4.)

The process of creating an eduational order program with electronics firms for testing (and, perhaps, some production) of defense products would involve the following steps:

- Identifying potential testing bottlenecks in defense production
- Identifying commercial electronics producers with much (or all) of the testing equipment in the identified bottleneck areas
- Analyzing the feasibility and cost-effectiveness of educational orders versus other options to reduce testing bottlenecks
- Entering into educational order contracts where these contracts are cost-effective.

These contracts would cover: (1) the purchase of specialized (standby) equipment and tooling needed to augment a firm's existing capacity to fulfill specific defense product testing (and perhaps production) purposes; (2) preparedness planning by the firm; and (3) a minimal amount of practice by the firm carrying out the functions called for in a standby agreement incorporated in the educational order contract. The standby agreement language would require the firm to maintain the capacity associated with the educational order and would require priority performance using that capacity in response to a Government activation order.

Authority and responsibility for creating a revived educational order program and activating the resulting standby agreements would rest entirely with the Department of Defense, as part of the defense acquisition process. Within DoD, the procuring activities would be guided by priorities set at the Service or OSD level and authority to activate the standby agreements would rest at one of these higher levels, as well.

While the educational orders could be funded within existing programs, they would be unlikely to receive support

within individual program budgets in competition with other program requirements unless a higher authority (in DoD or Congress) directs that funds be set aside for industrial preparedness program activities. Alternatively, educational orders could be funded as a distinct DoD program. Funds for activating the option within an educational order contract could be obtained from reprogramming unobligated program funds and from subsequent supplemental appropriations.

Creation of a voluntary agreement among defense and commercial electronics firms to transfer information about defense production needs and techniques and the availability of convertible capacity would follow procedures spelled out in the Defense Production Act and the Code of Federal Regulations. (These procedures are described in detail in TASC report TR-5142-5.) Sponsorship of such an agreement would naturally fall to the Department of Defense.

At least two important questions would have to be resolved during the development of such an agreement:

- Would the agreement be maintained in active or standby status? (An active program could help planned producers become better prepared to support emergency requirements. This improved level of preparation would have to be weighed against potential antitrust problems resulting from the exchange of technical information among current and potential competitors)

- What companies would participate in such an agreement? (Participation would be guided largely by the scope of products to be covered by the agreement. This scope could range across the entire spectrum of electronics down to a single problem item.)

A second standby agreement program could be modelled after the Machine Tool Trigger Order Program. The purpose of the MTTOP is to stimulate earlier production of machine tools in anticipation of need generated by an emergency. The stimulant is a Government purchase commitment. The Government commits to purchase an ordered tool if an alternate buyer does not come forward at the time when the tool is ready for delivery. (The MTTOP is examined in detail in TASC report TR-5142-4.)

A Test Equipment Trigger Order Program (TETOP) could be implemented by either DoD or a civilian agency or some combination of the two. The critical elements of such a program would be comparable to those of the educational order program described above:

- Identifying potential testing bottlenecks in defense production
- Identifying firms that can produce the test equipment and tooling needed to reduce these bottlenecks
- Analyzing the feasibility and cost effectiveness of the TETOP versus other options to reduce testing bottlenecks
- Entering into standby contracts with capable firms to produce needed test equipment and tooling.

The standby contracts would contain provisions similar to those in the MTTOP, but unlike the MTTOP, a TETOP would encompass specialized, as well as more common, equipment and tooling.

Regardless of which agency took the lead role in implementing a TETOP, both DoD and one or more civilian

agencies would have to participate in the process of identifying requirements. The former would be responsible for defense contractor and subcontractor requirements while the latter would focus on lower-tier industries that supply parts and components for both defense and essential civilian products. Activation authority for a TETOP would rest with DoD, who would also have responsibility for establishing planning conditions under which orders should be triggered.

As with the MTTOP, authority for a TETOP is encompassed in Title III of the Defense Production Act. A standby revolving fund might have to be authorized under this title and funds appropriated to ensure the ability to activate the trigger orders in a timely fashion. (Otherwise, congressional action would be needed prior to activation, and a slow response by Congress could impede timely activation.)

3.4 BENEFITS AND COSTS

All of the agreement programs described in this chapter offer means to reduce production lead times and bottlenecks. The keys to each standby program's potential contribution to industrial responsiveness would be the resources committed to each and timely activation. The educational order program would require funding for both standby capabilities and planning. The TETOP would require funding for preparedness planning and standby funding for program activation. A voluntary agreement would require no special funding.

Experience with the educational order program from 1939 to 1941 indicates that this mechanism cut 4 to 12 months

off the time needed to convert industrial capacity from civilian to military production. Comparable results might well be possible from a revived educational order program dealing with test equipment. Current lead times for acquiring special test equipment and tooling frequently exceed one year. Conceivably, much or all of this lead time could be eliminated by quickly converting the capacity of another firm with the required equipment, tooling, and experience.

The potential cost effectiveness of an educational order program would hinge on the convertibility of test equipment and tooling from civilian to military production. Our examination of test equipment issues in the FEMA study, "Cost-Effective Options to Enhance U.S. Industrial Mobilization Potential," suggests that conversion potential does exist; however, this potential varies from item to item and must be examined on a case-by-case basis. In virtually all cases, some specialized equipment and tooling would be required.

The cost effectiveness of the educational order approach would be inversely related to the amount of additional equipment and tooling needed to augment a firm's existing capabilities. At some point, it would be more cost effective to purchase extra test equipment and tooling for the current defense producer, particularly because that producer is already educated in the functions covered by a potential educational order. In other words, the current producer should be able to make better use of additional capacity by virtue of being further down the learning curve.

Similarly, the potential effectiveness of an educational order program could be undermined by inadequate communications between the current and a standby producer of a given defense item. Without adequate communications, it

would typically take longer to educate a standby producer, and it would be more difficult to integrate this producer into the production process if the standby agreement were activated. This would be true, particularly, in cases where work in progress must be transferred back and forth between the current and the standby producers. Voluntary agreements (or their equivalents) were employed during both world wars and the Korean War to facilitate this type of communication between firms engaged in interrelated defense work. Such agreements were credited with considerable success in easing production problems and speeding output during these past wars.

With respect to the TETOP -- the second standby agreement program discussed in this chapter -- experience with the MTTOP and its predecessor programs offer some evidence that a trigger order program for test equipment could be an effective means of reducing production lead times and bottlenecks. However, we are unable to quantify the potential reduction in lead times with any degree of certainty because historical data are sketchy and do not provide a clear indication of the impacts of trigger orders in the past.

The potential lead time saved in acquisition of additional test equipment and tooling needed to alleviate production bottlenecks could range from a few weeks to quite a few months. The amount of time saved would depend on how much earlier a needed piece of equipment or tooling is ordered and on how much a test equipment producer increases production of needed equipment and tooling in response to a triggered order. Triggering an order does not definitely result in earlier output of the needed equipment and tooling. However, if it caused an equipment producer to increase production or to

shift production from nonessential to essential items, it would lead to earlier delivery of needed test equipment and tooling.

3.5 PROBLEMS

The biggest obstacle to either of the standby agreement programs described in this chapter is the more general problem of acquiring funding for industrial preparedness program purposes. The educational order program, in particular, would require substantial funding for standby equipment and tooling. This program might also be opposed by current defense producers who could fear increased competition and reduced business resulting from the creation of standby "competitors."

Besides Government concerns over the antitrust risks, the biggest obstacle to creating a voluntary agreement is the possible unwillingness of companies to participate and share technical information. This objection would be reduced if the voluntary agreement were maintained in a standby status. Companies would be more likely to share information during an emergency than during normal peacetime operations. In peacetime, competitive considerations might overshadow national security ones.

The specialized nature of much of the test equipment and tooling used in some defense industries stands as another major problem that could affect all three programs described in this chapter. The more specialized the testing capacity for a defense item is, the more difficult and expensive it would be to convert commercial capacity to test that item. Similarly, creation of contracts to produce highly specialized

test equipment and tooling would be complicated by the fact that specialized components and assemblies from a number of equipment producers might be combined into the final assembly by the defense contractor, who also produces the items to be tested. This suggests that the trigger orders might be more appropriately entered into (in some cases) with defense contractors rather than test equipment manufacturers.

4. CONSTRUCTION MACHINERY

4.1 INTRODUCTION

The construction machinery industry could be an important mobilization actor in two ways: (1) by producing equipment to meet increased construction needs associated with rapid economic expansion and (2) by converting to production of heavy military vehicles. Because of the potential for conflicting requirements, it is important to determine the best use of this industry's capabilities during a mobilization.

Demand for construction, and therefore construction machinery, would naturally increase in an emergency. It is not clear, however, that such an increase would require substantial increases in production of construction equipment. Some increased construction requirements could be satisfied within the construction industry's existing capacity. However, total capacity in the construction industry has been shrinking, so the capability to meet mobilization requirements totally with existing equipment has likewise been declining.

Standby agreements might be used to reduce parts and equipment bottlenecks likely to result from a sudden and substantial increase in demand. They could also serve to facilitate conversion to critical parts production for military vehicles. Voluntary agreements could be used to expedite the flow of materials between suppliers and manufacturers and to help address military and civilian production priorities. As described in this chapter, standby and voluntary agreements

would probably be more useful to increase construction machinery production than to convert capacity to production of military vehicles.

4.2 REQUIREMENTS

Decisions governing conversion of plants in this industry to defense production must take into account two distinct sets of requirements: the requirement for new construction machinery to meet increased construction needs (military and civilian) and the requirement for military hardware that a converted plant could produce. Insofar as conversion implies a tradeoff between these two sets of requirements, the relative advantages and alternatives to each must be weighed.

Demand for construction equipment is related to demand for new construction. Since the construction industry has a certain amount of excess capacity, increases in building activity do not necessarily translate into comparable increases in equipment orders. A surge in demand for construction would initially be met through more efficient utilization of existing operating equipment and reactivation of machinery in storage.

In the event of a mobilization, demand for new construction would probably increase dramatically. According to Colonel Edward Rapp of the Army's Office of the Chief Engineer:

> Mobilization is a discontinuity. World War I and World War II indicate that a construction surge on the order of 50 times prewar levels can be expected in a mobilization.

Peacetime military construction represents less than 1 percent of the construction industry's yearly business. In World War I,

this figure jumped to 30 percent; in World War II, to 60 percent; and in the Korean War, to 10 percent. This surge is reflected in outlays as well. New defense construction typically accounts for less than 2 percent of defense budget outlays. In World War I and World War II, construction outlays alone exceeded previous annual peacetime defense outlays.

While some capacity gains could be achieved through termination of nonessential civilian projects and utilization of whatever excess capacity exists in the construction industry, demand for building services could well exceed even this added supply. Demand for construction equipment could rise accordingly.

This demand must be balanced against the need for military vehicles, since some capacity of the construction machinery industry could be converted to support production of such vehicles. Mobilization requirements for such vehicles would necessitate production increases beyond current and planned producers' capacities under the more extreme scenarios. In such cases, some conversion of the construction machinery industry could be desirable. The primary issue would be whether converting production facilities for defense purposes would impinge on the construction industry's ability to meet needs for construction equipment.

4.3 THE CONSTRUCTION MACHINERY INDUSTRY AND CONVERSION

Motorized construction vehicles fall under the general industry heading "construction machinery" (SIC 3531). The construction machinery industry manufactures a variety of equipment, including:

- Tractors (tracked or "crawler" or wheel), which push earth or soil with a front-mounted plough shovel
- Loaders (crawler or wheel), which have large, rectangular, front-mounted shovels for lifting material into trucks
- Scrapers, which level uneven terrain by scraping and carrying earth from one area to another
- Graders, which flatten surface areas by pushing soil
- Trenchers, which dig holes and trenches
- Dump trucks.

As suggested earlier, the fortunes of construction machinery manufacturers closely follow those of construction contractors. The construction industry, owing to high interest rates in the last few years, has suffered marked economic declines in the 1980s. The total number of employees on construction industry payrolls dropped 13 to 14 percent between 1979 and 1982. Since then, activity has risen somewhat, but the industry as a whole is still struggling. Construction machinery manufacturers suffered a similar decline in 1982; however, shipments have risen since 1983, though still only on the order of the relatively low 1977 levels. Large firms, as well as small, have shared in this slump.

According to the most recent Commerce Department figures (1982 Census of Manufactures), 938 companies manufacture construction machinery, of which the 20 largest account for over 48 percent of total shipments (in dollars). Several of these large firms have taken drastic measures to maintain solvency. For example, International Harvester terminated its construction and farm equipment operations to focus solely on

trucks. Caterpillar, the industry's traditional leader both domestically and world-wide, has been consolidating its operations for the past few years, reducing excess manufacturing capacity and moving increasingly larger shares of its production facilities overseas to meet strong competition from European and Japanese firms.

These trends point to net decreases in industry capacity. Though current operations utilize only 50 to 55 percent of capacity at 1979 to 1981 levels, the decline in industry capacity since that time means that the present utilization rate probably represents roughly 60 percent of the industry's potential.

With overall capacity in the industry shrinking, the potential for conversion is declining as well. Decreases in manufacturing capability mean a larger portion of total capacity would have to be devoted to meeting demand for standard construction machinery products, leaving less for conversion purposes.

Even if conversion is an attractive option, the process of converting civilian plants for defense production must itself be considered. The relative ease or difficulty of conversion depends largely on the type of weapon to be built. The vehicles manufactured by the construction equipment industry share certain similarities with military transportation and armored vehicles. These include track-type locomotion, off-road durability, high-torque powerful engines, and large size. Similarities between military and civilian end products create certain intrinsic similarities in their respective production processes, but many dissimilarities exist as well. For example, the tooling and metal-forming equipment used to

manufacture steel parts for construction equipment are not readily convertible to the manufacture of aluminum and composite parts found with increasing frequency in armored military vehicles.

Likewise, both similarities and dissimilarities exist in the manpower and infrastructure areas. Similarities between current and converted production reduce the learning required by a conversion. Workers, managers, and engineers all must be retrained to the extent production of military vehicles requires work with different materials and processes. The same is true in the supplier and transportation areas. To the extent existing supplier and transportation networks can be used with little or no changes, the possibilities for conversion increase.

A 1982 research report of the Mobilization Studies Program of the Industrial College of the Armed Forces (ICAF) studied the issue of conversion with respect to the M109A2 Self-Propelled Howitzer. Caterpillar was considered as an alternate source in the study. The conclusion of the study was that Caterpillar was not an adequate alternate source for the M109A2. Problems associated with conversion were cited. The company was unaware of how much excess capacity, if any, it might have in an emergency, because mobilization demand for the equipment it produced in peacetime was unknown. Because Caterpillar manufactures and assembles products made from iron and steel, complete revision of manufacturing/assembly processes would have to be undertaken to produce the howitzer's aluminum parts. The study also highlighted concern that Caterpillar's custom-designed machines would not be adaptable to M109A2 manufacturing. Therefore, conversion could necessitate large-scale replacement with new machines and tooling. Caterpillar indicated it might be able to supply certain critical

parts for the M109A2, though details involved with such production were not discussed.

While this ICAF report highlights the difficulties of conversion, it does not foreclose all options in this area. The following sections outline ways in which standby and voluntary agreements could be used with respect to this industry.

4.4 AGREEMENTS

Companies in this industry might participate in two different types of voluntary agreements. Any manufacturers who are completely or partially converted to produce military vehicle components would undoubtedly participate in any integration committees formed to support these programs. These voluntary agreements could help these new producers convert their production processes, help schedule component production and deliveries, and resolve materials, equipment, or component bottlenecks.

A voluntary agreement of the construction machinery industry itself might be useful in the face of a sudden surge in construction machinery orders. In particular, such agreements could be used to coordinate delivery of interrelated components between prime and subcontractors, facilitate exchanges of raw material and parts stock, and provide a forum for exchanges of information on production processes and techniques.

Because voluntary agreements can maximize output from existing plants by improving cooperation and alleviating bottlenecks, a construction machinery industry voluntary agreement might help the industry support both goals discussed

previously -- maximizing output of construction machinery while helping to identify and free up capacity for conversion to produce military vehicle components. Indeed, a voluntary agreement, or similar industry forum, might be a useful means to identify, in peacetime, the emergency role of the industry and to recommend how to address its two likely wartime responsibilities.

Standby agreements for specific parts, components, or assemblies might also be considered. Educational orders could help prepare a commercial firm for conversion if that is viewed as being a desirable and viable option. Agreements covering production of parts or components rather than completed military vehicles would be the best option because the complexities associated with the conversion are reduced significantly and educational orders are more cost effective when targeted at bottleneck items rather than entire systems. (See Chapter 2 of TR-5142-4 for a discussion of the latter point.)

Standby agreements modeled on trigger orders could offer a different approach involving increased production of construction machinery rather than conversion to defense production. Increased output of such machinery could be needed for direct military applications (construction of military facilities in the United States or abroad), for industrial plant construction, and for "crash" construction projects in such areas as civil defense, mineral extraction or processing, synthetic fuels, and disaster recovery. Standby agreements could be triggered to promote early production of construction equipment to support increased construction activity. The relative utility of such an agreement depends largely on the level of increased need for new equipment. The shrinking capacity of the construction machinery industry suggests that such an agreement could become increasingly important in the future.

4.5 CONCLUSION

Perhaps more than most industrial sectors, the construction machinery industry offers a difficult choice between continued production of nonmilitary equipment and conversion to defense production. Regardless of the choice, standby and voluntary agreements can be used to expedite production increases. Through a trigger order approach, the Government could stimulate early increases in output of construction machinery. Through an educational order approach, the Government could enhance conversion capabilities and could stimulate earlier production of bottleneck parts and components needed for increased production of military vehicles. Finally, through a voluntary agreement approach, the Government could use the expertise and cooperation of industry to increase needed production. The industry's efforts to convert could be helped through its participation in voluntary agreements for the programs individual firms are supporting, while an industry-oriented voluntary agreement could help the industry collectively address conversion and continued civilian production problems.

5. HELICOPTERS

5.1 INTRODUCTION

During the Vietnam War, United States firms increased output of military helicopters several-fold. In a sense, this industry undertook a limited mobilization effort. Helicopter purchases by the U.S. military in 1968 were more than 15 times current acquisition rates.

While the annual U.S. military purchase of helicopters has been declining, the sophistication and lead times needed to produce most of these helicopters have increased considerably. The lead time for production of a sophisticated military helicopter (like the UH-60 Black Hawk) is now in excess of three years. Various preparedness measures, including standby agreements or weapons program integration committees (a form of voluntary agreement), could be used to shorten this lead time. However, other factors being equal, it would be possible to increase output of less sophisticated helicopters far more quickly than output of the most complex military models.

These less sophisticated helicopters could be simple military models, commercial models enhanced for military uses, or even more complex military helicopters modified to reduce long-lead time parts, components, and assemblies. Emergency production of these less sophisticated helicopters could be facilitated by a standby agreement program. Such a program might encompass planning increased production, funding modified helicopter designs (for upgrading commercial models to military configurations or for downgrading hard-to-produce military

models), acquiring tooling needed to produce modified parts and components, and even producing modified helicopters for testing.

Production of less complex military helicopters could cause a gradual shift in the force structure during an emergency. Because of the delay in obtaining substantial increases in output of the top-of-the-line models, the simpler helicopters would be used to meet an increasing share of the required missions. Such helicopters are likely to be less capable in such areas as speed, agility, survivability, and lethality -- all characteristics important to modern battlefield conditions. Nevertheless, if they can be produced sooner and in greater quantities than standard military helicopters, they may be an effective option for increased industrial production, particularly during the early stages of a mobilization.

5.2 HELICOPTER PRODUCTION

The long lead times to produce military helicopters can be attributed primarily to the availability of parts and components provided by subcontractors and suppliers. Generally, 60 to 80 percent of a helicopter's value is produced by lower-tier industries. The inability to obtain parts and components from these producers in a timely fashion would be the biggest impediment to an immediate and sustained increase in helicopter output during a mobilization.

If the numbers and complexities of these parts and components could be reduced, helicopters could be produced more quickly. For example, if the supply of landing gears were inadequate to meet demand, skids could be substituted.

Similarly, a simpler engine that is more easily produced might be substituted for the more complex and survivable engines used currently. Unfortunately, the introduction of a major modification, such as a different engine, could entail considerable delay, unless the substitute engine is already in production and the helicopter manufacturer is practiced in producing the helicopter in the modified form. Developing a standby agreement could be important in testing the realism of the new design and identifying design changes that can minimize production bottlenecks.

Another viable approach to increase helicopter production rapidly to meet emergency needs might be simply to increase production of less complex helicopters. This approach is particularly attractive for those helicopters that are currently produced in both military and civilian configurations. For such helicopters, conversion from mixed military and civilian production to all-military would be a relatively straightforward exercise. The greatest impediment to such a shift would be the ability to obtain those additional parts and components used exclusively in the military configuration.

5.3 STANDBY AGREEMENT

A standby agreement to increase helicopter production could take two forms. The first would be a surge option clause in a current procurement contract to accelerate delivery and/or increase production of military helicopters in the event of an emergency. It would be a simple matter to include such a clause in peacetime procurement contracts. Some additional effort in the area of preparedness planning would also be required to ensure that a manufacturer is capable of meeting

the standby requirements. The second form of standby agreement would be an educational order with a planned producer (for a helicopter currently being produced by another firm or a modified version of a helicopter currently being produced). An educational order would involve increased planning, acquisition of standby equipment and tooling to augment existing plant capabilities, and a minimal amount of actual practice producing the item covered by the order.

The responsibility for instituting and activating either type of agreement would fall naturally to DoD acquisition activities. In the case of a surge option clause, contract language would require preparedness planning by the current or planned producer, and the option clause provisions would be based on this planning. In other words, a producer would identify constraints on accelerating and increasing output and would estimate a maximum level of monthly output for each month following activation of an option clause. The producer would also be required to update these estimates periodically to reflect any changes resulting from changing production capabilities. The DoD acquisition authority would be responsible for monitoring the producer's planning efforts to verify their accuracy and for activating the option clause in the event accelerated or increased production is desired.

These same responsibilities would apply in the case of an educational order; however, considerably more effort would be required to identify and select educational order candidates, because they could involve considerable cost -- the cost of acquiring standby equipment and tooling and the cost of producing a small (uneconomical) number of items (for practice). The cost dictates the need to identify and to prioritize candidate items for educational orders and to fund only those orders determined to be cost-effective.

5.4 BENEFITS AND COSTS

Surge option clauses and educational orders could both result in earlier and more effective activities to increase helicopter production. Surge option clauses could shave weeks or months off the administrative lead times generally associated with a contract change or a new contract award, and the planning associated with such clauses could better prepare helicopter producers to accelerate production from peacetime levels by identifying problems and solutions in a more timely manner. In addition to these benefits, educational orders could be used to create standby production capabilities. In particular, such orders could be used to train a planned producer in the manufacture of a helicopter and to acquire additional equipment or special tooling needed by that producer for such production. This training and the acquisition of standby capabilities could save a year or more in the time needed to gear up production of a helicopter.

The primary constraint on increased output would be the availability of sufficient parts and components for final helicopter assembly. If key inventory items were in short supply, then neither a surge option clause nor an educational order would have much of an impact in terms of earlier and sustained increases in helicopter output. Therefore, preparedness planning and measures to overcome shortages of long-lead time items would be critical to the success of either an option clause or an educational order. Thus, while a surge option clause costs virtually nothing in and of itself, associated expenditures in industrial preparedness measures (e.g., rolling inventories of long-lead time items) could be considerable, and without these expenditures, the potential benefits of speeding helicopter production over the short term could be

largely offset by an inability to sustain an increased production level or even to maintain the peacetime level once parts and components inventories have been consumed.

One possible way of avoiding the parts and components problem is to plan to produce simpler helicopters* that do not embody the longer-lead time items. Educational orders could be used to prepare for production of helicopters whose designs have been modified to eliminate such problem items. Without an educational order, the potential time advantage of producing a simpler helicopter would likely be lost in the time needed to redesign the helicopter, to obtain special tooling and equipment for production of the new design, and to learn how to manufacture the different helicopter.

Designing a modified helicopter, planning for production of such a helicopter, acquiring special standby tooling and equipment to produce the helicopter, and actually producing one for practice could entail considerable cost. This cost would have to be examined on a case-by-case basis to determine whether it is justified by the resulting benefits.

Consideration would also have to be given to potential shortages of ancillary equipment for helicopters and means of remedying those shortages. There would be little point in increasing helicopter output if the helicopters could not be used for lack of armament, for example.

*In addition to continued production of more complex helicopters.

5.5 POLITICAL CONSIDERATIONS

As already suggested, the idea of planning to surge production of simpler helicopters is likely to encounter resistance, even though such helicopters could be manufactured sooner and in greater quantities in response to an emergency need. Military thinking has traditionally favored the most sophisticated and capable equipment and has opposed efforts to reduce costs and increase quantities by acquiring simpler weapon systems.

Nevertheless, the idea is consistent with a current Army Materiel Command initiative to prepare "mobilization technical data packages (TDP)" for more producible versions of critical weapon systems. The principal advantage of proceeding beyond preparation of TDPs to negotiate actual agreements is that it would ensure integration of the new design with contractor planning, identify likely production bottlenecks, and avoid administrative bottlenecks in negotiating new contracts or change notices at the time production of the simpler design was required. The planning associated with preparing the standby agreement could provide a test of the feasibility and value of the TDP.

6. FORGINGS

6.1 INTRODUCTION

During 1979 and 1980, quoted lead times for some forgings exceeded two years as orders from both military and commercial aircraft manufacturers swamped the few operators of the heaviest forging presses and hammers. According to a Joint Logistics Commanders Study,* three firms were responsible for producing over half of the longest lead time forgings identifed by the study. This experience is indicative of what could happen to forging lead times during a surge or mobilization (when demand for aerospace forgings could make a quantum leap). In this chapter, we examine how both the standby and voluntary agreement mechanisms might be employed to prevent lead times from lengthening dramatically during a period of rapidly rising demand.

While many causes have been cited for long forging lead times, most stem from the fact that each large aerospace forging is generally produced by a single firm. Reliance on a single supplier prevents a ready transfer of business to an alternate supplier when the former is unable to complete the desired work in a timely fashion. Both standby and voluntary agreements could be used to speed creation of alternate producers when a current supplier is unable to guarantee timely performance. The purpose of both types of agreements would

*Joint Logistics Commanders' Ad Hoc Group on Forgings and Castings, "Forgings and Castings Report," DoD, January 25, 1982.

be to expedite efforts to balance essential demand among forging companies during an emergency. In essence, these agreements would be used to help transfer essential work from an overloaded operator to another firm who would be able to produce the essential items sooner.

6.2 FORGING LEAD TIMES

While the North American forging industry is composed of approximately 350 establishments, only 40 produce items for the aerospace market, and of these 40, only 5 or 6* have sufficiently large equipment to produce the largest aerospace structural forgings. During the 1979 to 1980 period cited above, only 3 companies produced the largest aerospace forgings, so the increase to 5 or 6 producers represents a substantial expansion of heavy forging capacity. Nevertheless, many of the causes underlying the dramatic increases in lead times during 1979 and 1980 have not been affected by this expansion of capacity. These causes included:

- A lack of sufficient numbers of skilled labor to operate a second or third shift
- A lack of sufficient auxiliary equipment to support full utilization of a heavy press or hammer (i.e., an equipment bottleneck)
- A shortage of materials caused by a simultaneous increase in demand and reduction in supply (i.e., a materials bottleneck)

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*Cameron Iron Works, one of six heavy press operators, primarily produces extrusions with its heaviest presses and does not compete for much of the aerospace structural forging business.

- A protracted labor strike at one of the three primary producers of large aerospace forgings (which delayed production by that producer and placed greater demands on the other two)
- A failure to perform in accordance with priorities established by the Defense Priorities System (which forced defense orders to wait in line behind earlier commercial orders)
- A reliance on single-source producers (which impeded use of alternate producers when the single-source producer was unable to meet increased demand in a timely fashion).

Additional producers have created greater overall heavy forging capacity and have introduced more competition for heavy forging business. While there appears to be a growing tendency for customers to dual-source forgings, the portion of large aerospace forgings supplied by single-source producers still remains high. Because of considerable tooling costs and relatively small production runs for any given forging, only one die set is generally created for each forging. This die set is owned and controlled by a forging company rather than by a forging customer (even though the die set is most often for a unique part produced for only one customer). Die sets are rarely transferred between forging companies, so customers are forced to rely on a single supplier or to bear the additional cost of producing a second set of dies for an alternate producer.

The time required to produce a second set of dies -- more than a year in some cases -- is the major impediment to creating a second source during a surge or mobilization. Without a second set, a forging customer is totally dependent on

its current source for any given forging. This dependency poses problems when the current source is unable to keep up with demand.

If essential business could be balanced by transferring dies rather than creating second sets of dies, this could have a positive impact on forging lead times. Instead of delaying production of a forging until a new set of dies has been created, an alternate source could produce forgings from a transferred die set as soon as the work could be scheduled. The potential advantages of such a transfer could be particularly pronounced today, due to the current composition of heavy forging business. Most of this business still resides with the three established producers because they were the only sources of large aerospace forgings until recently and, therefore, control the bulk of the dies for aircraft currently in production. In other words, a substantial imbalance exists now in how forging work is distributed. This imbalance would likely be aggravated by a surge or mobilization, unless some business was transferred to the newer heavy press operators.

6.3 AGREEMENTS

Both standby and voluntary agreements offer potential means for expediting the transfer of forging work from an overburdened producer to another firm. A standby agreement could provide the option to direct the transfer of dies from one firm to another under defined emergency conditions, and a voluntary agreement could permit cooperation among forging companies to direct the allocation of forging work.

The fact that the Government rarely contracts directly for aircraft forgings poses a major problem for instituting a

standby agreement for the suggested purpose. A possible solution would be for the Government to require prime contractors to create standby agreements with their forging subcontractors to permit transfer of dies at the option of the prime contractor (rather than the Government). The option could be simple and unqualified or could contain a variety of limitations, such as:

- Conditions under which the option could be exercised (e.g., the inability of the forging firm to perform within a given time frame or the existence of a national state of emergency. Apparently, some contracts between forging companies and their customers already stipulate that the customers can request transfer of dies under extraordinary circumstances, such as a protracted strike at the forging facility)
- Reimbursement for past maintenance costs and the undepreciated value of the dies
- Stipulations concerning if and when the dies must be returned and in what condition.

Theoretically, if the Government mandated such an agreement between a prime contractor and a forging subcontractor, it would place a prime contractor in a strong negotiating position (by "tying the hands" of the prime contractor). Nevertheless, established forging companies might be expected to resist implementation of these types of agreements, because such agreements could weaken their claims to dies in their control and could eventually lead to a system where the customer, rather than the forging company, controls the dies.

A voluntary agreement among forging companies could offer an alternate (or additional) means of balancing work

among different forging establishments. Under such an agreement, forging companies could jointly develop solutions to a number of problems:

- The allocation of essential work among companies so lead times and bottlenecks are minimized
- The allocation of raw materials so shortages and hoarding are minimized
- The standardization of tooling so dies are transferred more readily
- The exchange of technical information so production problems are resolved more quickly and efficiently
- The eventual return to a competitive environment (after an emergency has ended) so barriers to cooperation during an emergency are minimized.

A voluntary agreement of this type would have elements of the Voluntary Agreement on Cast Armor for Track-Laying Type Vehicles and the Voluntary Tanker Agreement. (Both agreements were established during the Korean War, and the Tanker Agreement still exists today in a standby capacity.) The Cast Armor Agreement was established to provide for the exchange of technical information among seven foundries producing cast armor for tanks and other armored vehicles. The Tanker Agreement was created so tanker operators could exchange information about capabilities and recommend the allocation of tanker capacity to meet military and commercial fuel transportation requirements. A "Voluntary Forging Agreement" could involve both the transfer of technical information and the allocation of work.

6.4 PROBLEMS

Especially in a non-emergency situation, resistance to either type of agreement by some forging companies could develop from the fact that the established heavy press operators might view them as a threat to their current dominant positions. They have more production experience and longer-standing relationships with their customers than the newer heavy press operators. Agreements that facilitated the transfer of work to the newer operators would hold little attraction to those companies most likely to lose market share.

Potential resistance to these agreements might be reduced in several ways:

- By specifying strict parameters for activation of these agreements (such as limiting their use to national emergency situations), it might be possible to lessen the perceived threat to "business as usual" during peacetime
- By mandating the inclusion of option clauses in subcontracts written between defense prime contractors and forging subcontractors, the Government might force acceptance by forging companies
- By noting that Government-mandated allocations of forging work (during an emergency) might be even less desirable, the Government might encourage cooperative industry efforts as a means of avoiding greater Government intervention.

A second potential problem is the absence of standardization among heavy presses and tooling. This could impede the ability of one company to use tooling originally designed for use on another press or hammer. However, past

transfers of dies between companies offer evidence that dies from one company can be set up on another company's press.

6.5 BENEFITS AND COSTS

The obvious benefit from use of either type of agreement would be the reduction of forging lead times. The amount of this reduction could vary considerably, from a few weeks to several months. Less time would be saved if all presses and hammers were overwhelmed simultaneously with essential business because the entire industry would be characterized by long production queues. However, if some capacity were being underutilized or were being used largely for nonessential work, a shift of essential work to these facilities could speed output. Other cooperative activities under a voluntary agreement, such as allocation of scarce materials and exchange of technical information, could also result in improved productivity and, therefore, a higher level of output from existing capacity.

Like the potential benefits, the potential costs of such agreements are hard to measure without defining specific characteristics of the agreements, requirements for forgings, and conditions of the forging industry. The cost of option clauses between prime contractors and forging subcontractors concerning transfer of tooling would depend largely on treatment of tooling costs. If one argued that customers already pay for dies either directly or indirectly (i.e., the tooling cost is amortized in the cost of each forging), then it would be natural to conclude that a tooling transfer option should cost little or nothing. If the customer already pays the tooling costs, there is little justification for an additional charge associated with the option. However, forging companies could argue that tooling, like facilities and equipment, is a

capital investment and, therefore, the property of forging companies. Under this interpretation, exercising an option would require reimbursing a company for tooling transferred from it. This cost could be considerable.

6.6 CONCLUSION

Creation of standby or voluntary agreements with heavy press operators would require special treatment in light of the fact that the Government does not generally contract directly with these operators. In the case of a standby agreement, the suggested approach would involve the Government mandating the creation of standby agreements between prime contractors and their forging subcontractors. In the case of a voluntary agreement, the Government would have to develop a special system for carrying out any allocation plan suggested by the press operators. For example, rather than DoD simply purchasing forgings in accordance with a suggested plan, FEMA or DoC could direct allocation of work among forging companies (in accordance with the plan).

A voluntary agreement solely among parts and components suppliers is a novel approach. Previous agreements that included such suppliers also included prime contractors who took the lead in allocating parts and components supplies among themselves. A forging company supporting many programs might theoretically participate in dozens of agreements, but forgings would not be a major focus of any of these, and none would have adequate visibility of the multiple program requirements for forgings. In an emergency where forgings (or any other component) were a common bottleneck in many systems, an agreement focused on the forging industry (or another lower-tier industry) might provide

an effective way to focus attention on the specific production or supply problems. The possible use of voluntary agreements to coordinate multiple program demands in lower-tier bottleneck industries is an idea worth further consideration.

7. SEMICONDUCTORS

7.1 INTRODUCTION

The domestic semiconductor industry is a source of both strength and concern for our national security. The strength derives from our longstanding technological leadership that permits us to build smarter and more capable equipment to support our national security needs. The concern results from the common use by U.S. companies of offshore production facilities for assembly and, in some cases, testing of their semiconductor products. Due to a higher risk of disruption caused by political and military conditions, production from these offshore plants is less secure than that from domestic facilities. Internal political turmoil, a deterioriated trading relationship with the United States, or interdiction of trade routes by an enemy could each cause an interruption in supply from one or more foreign plants.

The potential calamity resulting from such an interruption could be reduced or prevented altogether, if it were possible to acquire the lost production capability from another plant either by converting an existing plant to the needed purpose or creating a new plant. However, there are numerous barriers to obtaining needed production quickly from an alternate plant. A voluntary agreement among semiconductor companies could help reduce many of these barriers and could result in earlier output from an alternate source if supply from one or more offshore plants were interrupted. This chapter examines issues related to such a voluntary agreement.

7.2 OFFSHORE PRODUCTION

U.S. semiconductor companies first began building plants abroad more than 25 years ago and have become increasingly reliant on these facilities to meet both assembly and testing requirements. Today, virtually all major U.S. "merchant"* companies operate at least one offshore plant where they complete most of their package assembly work and a growing share of their testing. In fact, many companies now do all their assembly work in foreign facilities. The exodus to foreign production sites is driven primarily by simple economic logic -- foreign labor (in Third World countries) is considerably cheaper than U.S. labor. In addition:

- Some foreign governments have offered attractive financial benefits, such as long-term tax abatements, to lure foreign investors/employers
- Some plants have been located offshore to provide better access to potential foreign customers and to circumvent trade barriers which could otherwise prevent access to foreign markets
- More recently, plants have been located offshore to provide access to skilled manpower, particularly engineers, who are in short supply in the United States.

While much of the package assembly work has migrated abroad, considerable assembly capacity still exists in the United States in captive firms and in firms that produce

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*There are actually two semiconductor industries -- one consisting of firms selling in the open or "merchant" market and the other composed of "captive" semiconductor operations that produce exclusively for consumption by their parent companies.

certain types of defense-qualified semiconductors (which must be 100 percent U.S. manufacture). In addition, the bulk of the wafer fabrication and testing work by U.S. firms is still done domestically. Thus, domestic semiconductor capacity represents a sizable reservoir to meet emergency needs. An ability to convert this capacity rapidly from nonessential to essential semiconductor production could mitigate the potential disruption caused by the loss of output from a number of offshore plants. A voluntary agreement could promote more effective conversion. Standby agreements could also help prepare firms for conversion.

7.3 AGREEMENTS

A voluntary agreement could be created to help deal with potential semiconductor problems resulting from loss of supply from offshore plants. Voluntary agreements might deal with bottleneck and production issues, such as prioritizing production and test resources and identifying ways to balance workloads. Especially in the immediate aftermath of a foreign source cutoff or other disruption, it may be necessary for semiconductor companies to share capacity extensively. For example, a company with excess testing capacity might conduct these operations for other producers. The voluntary agreement would facilitate these activities and also help convert new production sources.

Conversion of domestic capacity could be hampered by a reluctance of one firm to share its business and production knowledge with another firm, by the time needed for the second firm to learn how to produce the essential products, and by the need for that firm to acquire any special tooling and test

equipment needed in the production of the first firm's semiconductors. A voluntary agreement could help deal with each of these barriers. Through a voluntary agreement, the second firm could have its ability to use any transferred technology restricted after an emergency has ended, so as to protect the business base of the first firm; the first firm could help educate the second firm and could even loan key personnel for this purpose; and the voluntary agreement committee could help the second firm acquire needed special tooling and test equipment by prioritizing and allocating industry demand placed on producers of such items. Such an agreement could take on many forms, based on how the following questions were resolved:

- Would the agreement be maintained in an active status? (Conceivably, an active voluntary agreement during peacetime could be used to create greater standardization of semiconductor products, which could facilitate the transfer of work during an emergency. A peacetime voluntary agreement might also identify critical issues and preparedness actions even if it did not formally address the creation of domestic capacity. However, the exchange of technical information during peacetime poses risks of anticompetitive activities)

- Would participation in the agreement be restricted to U.S.-owned companies? (Foreign-owned companies could help satisfy essential needs for semiconductor products, but the transfer of technical information to such companies under the auspices of a voluntary agreement could pose national security problems)

- Would the agreement be used for allocating production resources or simply as a mechanism for transferring technical information? (Allocation of resources to optimize production could result in greater output, but could also pose a greater risk of anticompetitive activities.)

Either voluntary or standby agreements could also be used to identify new production or test methods that could increase semiconductor output or ways in which high volume commercial semiconductors could replace more specialized military products. Prior to an emergency, an educational order with semiconductor producers could prepare a producer to make new types of semiconductors or identify design changes that could increase output. Similarly, a standby agreement like the one discussed in Chapter 2 could identify ways to relax test requirements in an emergency.

Because of rapid changes in technology, standby agreements in this industry might quickly become obsolete. During an emergency, a voluntary agreement would be a more effective way to identify these product and process modifications.

7.4 BENEFITS AND COSTS

A standby voluntary agreement may be more politically viable than an active one. An active agreement could be perceived by the Justice Department and the Federal Trade Commission as offering too high a risk of anticompetitive activities and industry members may be reluctant to compromise their competitive posture in peacetime. A standby voluntary agreement might be more acceptable because it would only be activated at a time of heightened concern over our national security -- concern which could outweigh potential anticompetitive problems.

The potential benefits of a semiconductor industry voluntary agreement are difficult to quantify. However, because it would probably take nearly a year to build, equip, and man a new assembly and testing plant, it is likely that conversion

of existing capacity would result in earlier production of essential items. Of the steps in producing a semiconductor, package assembly, which is currently done offshore, generally requires the least skilled manpower and least complicated equipment, so it should be the easiest step to transfer to a new facility. To the extent alternate capability can be made available, conversion could replace the loss of offshore assembly capacity more rapidly than building new facilities.

Conversion of testing operations could pose a greater problem, if special tooling and equipment is required. However, far less testing (than assembly) is currently done offshore, so the risk of losing output from foreign operations is less in the testing area. Through a voluntary agreement, it might be possible, for example, for the package assembly work to be transferred to an alternate producer and for the assembled products to be returned to the original producer for final testing at one of its U.S. plants.

7.5 CONCLUSION

The importance of semiconductor production to our national security, combined with the heavy use of offshore production facilities by U.S. companies, necessitates efforts to ensure secure production sources. A voluntary agreement among semiconductor companies offers considerable potential for alleviating production problems during an emergency.

8. MACHINE TOOL RETROFITTING

8.1 INTRODUCTION

The supply of machine tools is a major constraint on the ability to increase production, so considerable attention has been focused on expanding this supply both during past mobilizations and in preparation for a future emergency need. In the past, expansion was achieved through a variety of programs. Tool builders were encouraged to expand their facilities and increase output by substantial increases in demand resulting from direct Government purchases, Government purchase guarantees, and increased ordering by private industry. The ordering by private industry was fueled by a combination of rising defense orders and incentives to invest in capacity. Incentives included advanced payments, loans and loan guarantees, and accelerated depreciation for tax purposes. In addition, during World War II, panels of machine tool industry experts were formed to identify ways to maximize utilization of available tools and reduce the need for new tools.

Such measures would likely be applied during a future emergency to speed production of machine tools and improve utilization of current tools. In fact, standby Government equipment (e.g., the General Reserve) and standby purchase commitments (i.e., the Machine Tool Trigger Order Program -- MTTOP) currently form the heart of preparations to deal with potential machine tool shortfalls. However, the potential benefit of these preparations is limited by the fact that the standby Government equipment (in the General Reserve) is old

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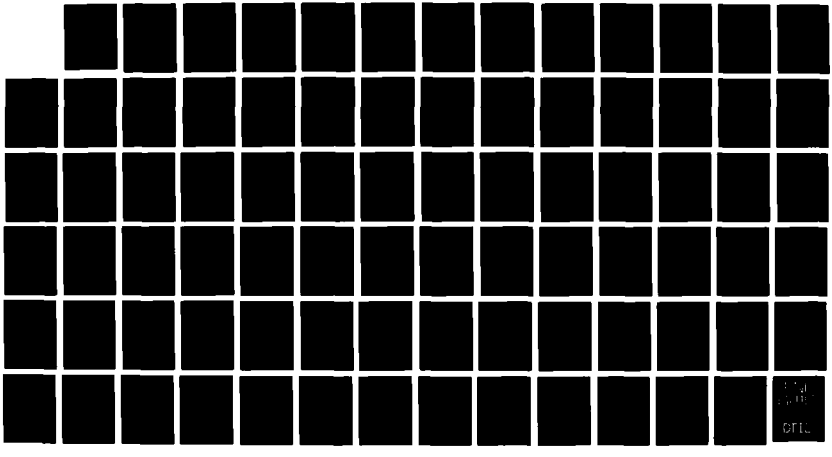

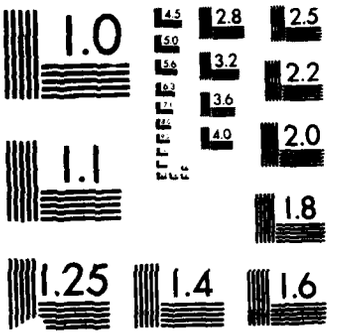
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and obsolete in most cases and that acquisition of new equipment through the MTTOP would be delayed by long lead times. Comparatively little attention has been given to possible ways to limit demand for new tools, although this may be the most important option for short-term machine tool bottleneck reduction in an emergency.

These problems could be addressed through a standby program to retrofit existing equipment and identify other reuse options. Retrofitting can frequently be completed in a fraction of the time and cost of manufacturing an entirely new piece of equipment. In this chapter, we examine how both standby and voluntary agreements might be applied to help achieve greater levels of essential output using existing equipment.

8.2 RETROFITTING EQUIPMENT

A number of factors have contributed to a decline in the preparedness of the U.S. machine tool base to support emergency production requirements:

- Foreign manufacturers have garnered increasing shares of the U.S. and world markets at the expense of U.S. producers. As a result, some U.S. producers have gone out of business and others have cut back their investments in capacity maintenance and expansion. In some industrial sectors, this has resulted in a diminishing and aging equipment base (and declining domestic demand for machine tools)

- Foreign machine tool builders have garnered increasing shares of the U.S. and world markets, so the U.S. machine tool industry has been in decline and is less

capable now of meeting potential emergency requirements for new machine tools than in the past

- The U.S. Government has invested little in maintaining its reserve of aging tools and in acquiring new tools, so existing standby equipment has extremely limited capabilities to meet current (and future) production needs.

While recent increased attention to the state of the defense industrial base and to the economic competitiveness of U.S. industry has stimulated a number of efforts (e.g., DoD Industrial Modernization Incentives Program, accelerated tax depreciation, and trade quotas) to strengthen domestic industries, many industrial sectors have continued to suffer a relative, if not an absolute, decline in their manufacturing capabilities.

With a declining domestic machine tool industry and an aging standby equipment base, it is prudent to examine additional preparedness options which place less reliance on these weakening resources. Two options that hold considerable preparedness potential are the conversion and upgrading of existing equipment. Basically, these options involve increasing the capacity of existing equipment by retrofitting the equipment so it can be used to produce an essential item (or more of an essential item).

Countless equipment modifications are possible, ranging from relatively minor changes (to accommodate different types of tooling) to extensive reconditioning, and even automation. Examples of such modifications are: changing mechanical components (e.g., replacing a mechanical clamping device with a magnetic plate on a grinding machine so work can be set up and removed more quickly); reconditioning parts

(e.g., reconditioning the ways* on a milling machine so work is milled more smoothly and precisely); adding new capabilities (e.g., adding a copying attachment to a lathe); and changing a machine's controls (e.g., replacing manual controls with automated ones). Through modifications to accommodate different tooling, it would be possible to convert many machines from civilian to military production purposes, and by adding new capabilities, it would be possible to make large increases in throughput for many machines. Automation alone could increase capacity of a machine by 50 percent or more in many cases.

Characterizing the industry involved in retrofitting machine tools is complicated by the fact that it encompasses a wide variety of businesses, including machine tool builders, electronics companies, and machine shops. In addition, modifications are frequently completed on site, wherever a piece of equipment might be located, rather than at a facility operated by the retrofitter, and modifications might be completed by the owner of a piece of equipment. This owner could purchase a standard modification kit (designed for the machine in question) or could do his own retrofit engineering and purchase necessary components from a combination of sources.

8.3 AGREEMENTS

In light of the diversity of the industry involved in machine tool retrofitting, measures to improve the technical information and the coordination of activities within this

*"Ways" are rails on which part of the milling machine slides to guide a piece of work through the milling process.

industry could have an enormous impact on the effectiveness and efficiency of modification work. Both standby and voluntary agreements could serve these purposes.

The standby agreement mechanism could be used in three ways. Trigger orders could be created with manufacturers of controls and complete retrofit kits (for universal tools) and could be used to stimulate production of these key items at the onset of an emergency, in exactly the same way as the MTTOP is designed to stimulate earlier production of entire machines. In fact, orders for tool retrofit components could be considered for inclusion in an expanded MTTOP.

A second use of trigger orders could be standby agreements with machine tool refurbishers and retrofitters to remanufacture and upgrade standby equipment in the General Reserve. Much of the standby equipment held in the General Reserve is old, obsolete, and of little value in terms of increased defense capacity. Conceivably, this value could be increased considerably through refurbishing and upgrading.

Educational orders are a third possibility for expediting equipment retrofits. Such orders could cover planning on how a given plant's equipment might be converted from civilian to military production or upgraded to increase total output. It could also involve acquisition of long-lead time components needed for a retrofit, and even installation of components, when such installation would not adversely impact current machine use. (Obviously, a retrofit to convert a machine from current production of civilian items to military ones would not be completed during peacetime.)

These educational orders might be part of a broader strategy to improve preparedness of defense-supporting industries. For instance, educational orders with a planned producer might provide for analysis and resolution of a broad range of bottlenecks (including machine tools). A similar methodology might be applied to current defense producers, although an educational order might not be the vehicle. DoD might commission a broad preparedness survey for key programs to identify machine tool and other bottlenecks throughout each program's market structure.

A fourth agreement option to enhance retrofit capabilities is creation of a voluntary agreement among machine tool retrofitters, remanufacturers, and manufacturers whose equipment could be converted to defense production during an emergency. If maintained in an active status during peacetime, such an agreement could be used to help identify opportunities for conversion and to plan such conversion. In a standby capacity, such a voluntary agreement could be activated during an emergency and used to transfer technical information about retrofit opportunities and to allocate limited retrofitting resources.

8.4 BENEFITS AND COSTS

Converted capacity has been a major source of defense production during past mobilizations. For example, converted automobile plants were used to produce a major portion of U.S. defense output during World War II. The automobile industry and other nonessential industries would be prime candidates for conversion in the event of another major mobilization effort. Conversion can hold a number of advantages over

construction of new capacity. These advantages include: an increased level of efficiency associated with use of an existing management structure and work force; a shorter lead time to achieve production capability; and a smaller requirement for additional resources to create the needed production capability. Therefore, retrofitting machine tools can hold advantages over manufacturing entirely new tools, in some cases.

The biggest drawback to retrofitting versus new manufacturing is the lesser capability of the tools produced by the former method. New tools tend to be sturdier and can accommodate higher horsepower and greater material throughput. They are also designed to be numerically controlled. While old equipment can be upgraded with numerical and computer controls, bigger motors, and so on, their basic designs are less well-suited to these new features. Nevertheless, on a dollar-for-dollar basis, retrofitting can frequently provide more production capacity because the cost of retrofitting is only a fraction of the cost of new manufacturing.

The retrofitting process is composed of several steps: (1) retrofitting opportunities must be identified (by answering such questions as -- what nonessential production can be curtailed and what essential production might be possible using the equipment idled by a production curtailment?); (2) design engineering must be completed for modifying a machine to produce an essential item; (3) retrofit components must be produced/procured; and (4) the actual retrofit work must be completed.

The first two steps would take a number of months in most cases, though this time could undoubtedly be shortened in response to an urgent need. The third and fourth steps would

normally take three to four months for a minor change to a universal tool and one to one and one-half years for a major change. These times would be even longer for specialized equipment. Under emergency conditions, these times could be cut in half for individual tools, but a long queuing time could result from a sudden and substantial increase in demand for retrofit work.

Both the standby and voluntary agreements described previously could shorten (or even eliminate) the time involved in the first three steps. The planning associated with a trigger order or an educational order would naturally involve identification of conversion opportunities, and, at least in the case of an educational order, would also encompass the redesign of equipment to be modified. The engineering work associated with redesigning equipment could be relatively costly, particularly for specialized equipment. This cost could be held to a minimum by limiting trigger and educational orders to conversion opportunities involving standard modifications to universal tools (rather than unique modifications to specialized tools). In this way, the engineering cost for each type of equipment could be amortized over a much larger number of modifications.

Educational orders could also involve production and acquisition of long-lead time components needed for a planned retrofit, but this, too, could be relatively costly. Purchases of standby components create the risk that these components would eventually become obsolete and be of little or no preparedness use. (Of course, eventual obsolescence is a near certainty with any defense equipment expenditure.) The high cost associated with purchasing and maintaining a stock of standby components would have to be justified by identification of a correspondingly high benefit.

An active voluntary agreement could serve as an alternate vehicle for planning and engineering conversion opportunities. However, an active peacetime agreement always entails some risk of anticompetitive behavior. A standby voluntary agreement is a lesser problem in this regard (because it would not be activated until an emergency which might out-weigh potential anticompetitive problems). A standby voluntary agreement, however, does not offer any benefits from pre-emergency planning activities. During an emergency, an activated voluntary agreement could expedite conversion activities by serving as a vehicle to identify conversion opportunities, to exchange technical information about retrofit engineering, to prioritize retrofit activities, and to allocate retrofit resources.

8.5 CONCLUSION

Despite ongoing modernization efforts stimulated by tax incentives, DoD programs, and normal economic activity, considerable potential still exists (and is likely to always exist) to gain defense production capacity through retrofit of existing machine tools. In many cases, retrofitting equipment would create needed capacity more quickly with fewer resource requirements than manufacturing entirely new equipment. Standby and voluntary agreements could both serve to speed the retrofitting process through planning, the acquisition of long-lead time components (educational orders only), and prioritization of work and allocation of retrofitting resources (voluntary agreement only).

9. MACHINE TOOLS

As noted in Chapter 8, the machine tool industry has been a major bottleneck in past mobilizations. The industry was the critical bottleneck in the early phases of both World War II and the Korean conflict because the need to convert nondefense producers and expand facilities created an enormous demand for new machine tools. Since the Korean conflict, the machine tool industry has been seriously affected by increased foreign competition, especially from Japanese machine tool producers. Despite increased R&D investments and the recovery of U.S. industry, as a whole, from the recession of 1981 to 1982, machine tool sales have remained relatively flat and import penetration has continued.

To protect against further deterioration, the machine tool industry filed a request for protection under Section 232 of the Trade Expansion Act in March 1983. Section 232 allows industries that are essential to national defense to request protection from foreign competition. The application is still pending.

Some observers contend that Japan has targeted U.S. machine tool markets and that, as a consequence, the continued viability of a domestic machine tool industry is in doubt. This could have serious national security consequences. However, opponents of trade protection argue that such actions would increase costs of machine tools and would not necessarily promote increased efficiency in the domestic industry. A voluntary agreement might provide a means to allow the

industry to restore its competitiveness and improve its economic condition, thereby improving defense preparedness.

9.1 AGREEMENT

A voluntary agreement could be formed of most domestic machine tool producers or limited to relatively small producers. While the specific activities of the agreement would have to be defined by the sponsor (logically the Department of Commerce) and members, the general purposes of the agreement would be:

- To focus Government and industry attention on solutions to machine tool industry competitiveness and responsiveness problems
- To foster industry cooperation or sharing of resources to reduce costs and improve the industry's competitive posture.

To a large extent, forming a machine tool industry voluntary agreement would represent a public-private sector partnership to restore the industry's competitiveness. It would require a substantial commitment on the part of both the industry and Government.

A number of activities might be of considerable benefit to the domestic industry and individual producers. Market segmentation, joint research and development, and joint marketing activities might all be pursued. For instance, joint development would allow companies to conserve resources and permit smaller companies to participate more actively in new product development. Joint marketing might allow smaller firms (who may currently be at a disadvantage with respect to

competitors who have larger marketing staffs and can offer integrated product lines) to offer fuller product lines and better market coverage while economizing on marketing resources.

Participants might also agree that each would provide less comprehensive, more specialized product lines to avoid dissipating development, production, and marketing resources on broader product lines. The purpose of this market segmentation would be to allow companies to concentrate resources on fewer products in order to improve their product lines and reduce costs. Such a strategy might also involve joint marketing so that several firms could collectively provide fuller product offerings to customers.

Industry financing issues could be another area of activity for the agreement. For example, the voluntary agreement might help make it possible for machine tool producers to obtain more favorable financing terms from private lenders. The agreement could also identify the most effective means for investing Government resources (under Title III of the Defense Production Act, the Manufacturing Technology or Industrial Modernization Incentives Program, etc.) and identify new investment opportunities for these programs.

The Government could support the agreement by identifying financial opportunities, making financial and regulatory assistance available, and expediting decisions on recommendations made by the committee.

Such a voluntary agreement would be similar in some ways to the small business production pools that were formed during the 1950s under the auspices of the DPA, although it would have a much broader purpose. These pools allowed small

businesses to enhance business opportunities by joining collectively to expand their production and marketing capabilities. (These pools are discussed more fully in Section 5.1 of Volume 2.) Indeed, the now-separate authorization under the Small Business Act for small business voluntary agreements could provide another means to authorize a machine tool voluntary agreement. Advantages and disadvantages of using the Small Business Act are discussed in Section 9.3.

9.2 BENEFITS AND COSTS

Improved competitiveness and increased responsiveness of the machine tool industry would be the principal benefits of a machine tool industry voluntary agreement. If the agreement could improve industry competitiveness, it could result in:

- Increased employment in a high-skill industry
- Improved trade balance
- Greater competition and reduced customer costs due to improved industry efficiency and retention, over time, of a larger base of domestic machine tool producers.

A larger and healthier domestic machine tool industry would also be more responsive to defense production requirements. Improved profitability could result in modernized, more capable production facilities, a larger domestic production base, and reduced foreign dependency.

A secondary benefit of the agreement is that it could test the utility of voluntary agreements in helping domestic industries that have been battered by foreign competition. If

the technique proved successful, it might be adapted for wider use in other important defense-supporting industries. Voluntary agreements could be an effective way to promote Government-industry partnerships to help industries restore their competitiveness. This could avoid the "Hobson's choice" of continued import penetration or widespread import protection.

The direct costs of the agreement would involve the time of Government officials to develop, review, participate in, and monitor the agreement and the costs of operating the agreement. Indirect costs include the risk that the agreement would reduce competition among producers. However, the potential for this type of activity could be controlled by limiting the scope of the agreement and through the continued monitoring of the agreement (required by the DPA) by Justice Department, Federal Trade Commission, and Commerce Department personnel. Moreover, by strengthening the domestic industry, the long-term impact of the agreement would be to increase competition and reduce costs.

9.3 POLITICAL CONSIDERATIONS

This section considers two elements of political feasibility:

- Whether a machine tool agreement would be permitted under present law
- Whether such an agreement would be politically feasible.

9.3.1 Legal Authority

Although this agreement would represent a novel use of authorities for voluntary agreements, it would be permitted by

the Defense Production Act. In order to create a voluntary agreement, the sponsoring agency must find that "conditions exist which may pose a direct threat to the national defense or its preparedness programs." The continued decline of an industry that has been critical in past military emergencies and the threat of losing access to foreign sources in an emergency could certainly be shown to pose such a threat. It is a well established matter of national policy that foreign sources outside North America should not be considered as reliable as domestic sources in planning ways to meet mobilization production requirements. (For instance, the DoD directive, instruction, and manual on industrial preparedness planning all prohibit planning for surge or mobilization production with any sources not located in the United States or Canada.) Besides vulnerability of sea lanes of supply, other risks involved in relying on foreign sources include political unreliability, the possibility that the foreign nation may need all its production for its own defense requirements, and the delay in obtaining supplies even if sea lanes remain open.

As long as this threat can be shown to exist, the sponsor may form a voluntary agreement to "help provide for the defense of the United States through the development of preparedness programs and the expansion of productive capacity and supply beyond levels needed to meet essential civilian demand in the United States." The legislative history on the most recent amendments (in 1975) to the DPA authorities for voluntary agreements makes it clear that maintaining the preparedness of essential industries in peacetime is a proper use of these authorities. Any voluntary agreement formed to improve the responsiveness of the machine tool industry would promote both preparedness and production capacity expansion.

The Small Business Act may provide an alternate authority for voluntary agreements to carry out at least some of the purposes described in this chapter. This Act, approved in 1953, replaced the authorities formerly in the DPA to create small business production pools and other small business voluntary agreements. (These authorities are described more fully in Section 5.1 of Volume 2. The legal provisions are reprinted in Appendix E of the volume.)

A Small Business Act voluntary agreement would have several advantages over a DPA voluntary agreement. Because the Small Business Act authorities have not been amended by Congress since the 1950s, they are much less constrained than the DPA authorities. The scope of the agreement could be broader (for any purpose to enhance small business). The administrative requirements for approving and implementing the agreement would also be much simpler. For example, under the Small Business Act, the sponsor would need to consult with the Attorney General only once before activating the agreement, rather than two separate reviews required by the DPA. In addition, the extensive DPA public notice, record-keeping, and disclosure requirements are not included in the Small Business Act (although some or all of them might be required by regulation). Additionally, participants in a Small Business Act voluntary agreement would receive immunity from antitrust charges, rather than the defense against these charges provided by the DPA. (The legislative history of DPA voluntary agreements is discussed in Chapter 3 and Appendix D of Volume 2. Chapter 7 of that volume describes the step-by-step process for establishing a DPA agreement.)

There would also be several disadvantages. Most notably, such an agreement would be limited to small businesses.

Large machine tool producers could not participate. In addition, the broader scope and less constrained authorities might provoke more political opposition. This factor is discussed further in Section 9.3.2.

9.3.2 Political Feasibility

A machine tool voluntary agreement could arouse both political opposition and support. The agreement is intended to strengthen declining companies in an important domestic industry that has been seriously affected by foreign competition. Such a proposal would be consistent with the philosophy of the Reagan Administration concerning trade and antitrust policy, which advocates improving the ability of domestic industries to compete in world markets. In addition, the agreement would have obvious benefits for our national security.

However, there could be objections to such an agreement. Because it would represent a novel application of DPA authorities, it could provoke concern about a Government-sponsored cartel in a basic industry. One school of thought holds that cartels can not only raise prices to consumers, but also are inefficient because they suppress competition among participants, development of new products, and entry of new competitors into the industry. Thus, it could be argued that such an approach would be an ineffective vehicle for improving domestic competitiveness and responsiveness.

This concern can be mitigated in several ways. First, the scope of the agreement will, of necessity, be limited. The DPA limits the duration of any voluntary agreement to two years, and provides that they may be terminated at any time. Furthermore, the charter of the agreement can be drafted to limit the

activities of participants to those deemed desirable from the standpoint of the public interest, and the continued involvement of Government personnel would restrict opportunities for anticompetitive behavior.

Moreover, natural economic conditions would limit the ability of the industry to form a cartel under the agreement. Because of its limited scope and the continued presence of foreign competition, efforts to force cartel pricing, suppress competition, or divide markets would be ineffective. Indeed, by improving the competitive posture of the domestic machine tool industry, the agreement would tend to increase, rather than diminish, competition.

It is difficult to predict whether an agreement sponsored under the auspices of the Small Business Act would be more or less controversial than a DPA agreement. Large machine tool producers might object to being left out of the agreement. In addition, people concerned about the potential for anticompetitive activities might prefer the more restrictive procedures required by the DPA. The narrower focus on defense preparedness required by the DPA, the periodic consultations with and monitoring by the Justice Department and Federal Trade Commission, the public notice and record-keeping requirements, and the limited protection provided to participants might all be regarded as useful protections; the absence of these requirements in the SBA, while simplifying the administrative requirements, might increase the concern about anticompetitive activities.

The political arguments in favor of the agreement could be very persuasive. It is undeniable that the industry is important to national defense and that its health and viability are threatened by foreign competition. Because the

voluntary agreement would permit actions to improve the health of the industry without imposition of trade quotas or other import relief (although such relief might be provided separately under Section 232), it could be attractive to political figures who are concerned about defense preparedness or the continued decline of American industry, as well as those who oppose import protectionism.

Such an agreement would be consistent with the thrust of the Reagan Administration proposal to help rationalize the structure of industries that have been affected by foreign competition. The Administration has proposed amending the Clayton Act to make it easier for firms in such industries to merge and strengthen the industry's structure. The voluntary agreement would have a similar impact, but would allow the individual firms to retain their independent identities. As either a supplement to or an alternative to trade protection, a carefully-defined voluntary agreement could gain significant political support.

9.4 CONCLUSION

Experience in past mobilizations shows that Government and industry can work together effectively to solve national security problems once the problem is clearly recognized and an objective has been established. In Chapter 2 of the second volume in this series of reports, we described how Government and industry worked together to resolve serious production problems during past mobilizations.

A machine tool industry voluntary agreement would be somewhat different from some of the other programs discussed in

this report. In a sense, it would represent a limited mobilization of Government and industry to resolve a specific national security threat: the continuing decline of an industry that has been, and is likely to remain, essential to the national security.

The principal importance of the machine tool industry voluntary agreement would be the certification, by Government and industry, that the industry's continuing viability is an important national security objective. If this objective were agreed upon by the Government sponsor and the industry, the voluntary agreement could address a wide range of responsiveness problems. The agreement could have an immediate impact on the financial condition of machine tool builders and also make long-term improvements in its competitive posture and responsiveness.

10. MINING

10.1 INTRODUCTION

Our dependency on foreign sources of supply for many types of raw materials needed for our economic well-being and defense production has been a major national security concern for many years. This concern led to passage of materials stockpiling legislation and the creation of a materials stockpile in 1939. The United States has maintained an enormous stockpile of strategic and critical materials ever since. The foreign dependency concern was also a driving force behind passage of the Defense Production Act in 1950. Title III of this Act provides for Government financing and guarantees to expand production capacity and supply. Title III authorities were used extensively during the 1950s to encourage expansion of materials production capacity and acquisition of materials for the Defense Production Act Inventory.*

Since the early 1960s, Title III authorities have often been cited, but rarely used, as means of expanding U.S. materials production capacity. Short of a reinvigorated peacetime use of these authorities, standby agreements may offer the best means of applying these authorities to meet emergency needs. One possible application of standby agreements in this regard would be agreements concerning the reopening of inactive mines. This application is examined in this chapter.

*Materials in the Inventory were gradually shifted to the National Defense Stockpile, sold, or used by the Government (e.g., to produce coins).

10.2 DOMESTIC SOURCES OF MATERIALS

The United States imports over 50 percent of its annual consumption of many critical materials. Imports stand at or near 100 percent of domestic consumption for such materials as columbium, mica (sheet), rutile (titanium), manganese, tantalum, bauxite (aluminum), cobalt, and chromium. There is little or no active mining capacity for these materials in the United States. Moreover, domestic mining operations for a number of other critical materials have been cut back sharply in recent years due to depressed commodity prices, caused by weak demand and an abundant supply of lower-cost materials available from foreign sources. The net results of recent materials trends are an increasing reliance on foreign sources of supply to meet U.S. materials requirements and an increasing incidence of mine shutdowns domestically.

The implications for industrial responsiveness are serious, because the U.S. economy is increasingly vulnerable to a loss of access to materials from abroad. Nevertheless, there are several options for dealing with a reduction or complete loss of materials imports. These include:

- Materials controls
- Drawdown of private inventories and Government stockpiles
- Substitution
- Increased domestic production.

The last category includes mining. Some increased production could be achieved by simply increasing the utilization rate of active mines. Additional production would be possible by reopening inactive mines. However, reopening an

inactive mine is a lengthy process, averaging as much as three years. The process would involve such activities as completing paperwork to comply with environmental and safety regulations, completing work associated with reopening (e.g., clearing the mine of water, refurbishing equipment, and acquiring new equipment and other mining materials), and hiring workers.

10.3 STANDBY AGREEMENTS

Standby agreements could be applied to both active and inactive mining operations to speed production increases during an emergency. In the case of active mines, the agreement could provide standby Government purchase commitments much like the commitments included in MTTOP contracts. The purpose of the purchase commitment would be to stimulate a mine owner's decision to increase production based on a guaranteed market. The Government would purchase and stockpile any output not required by the private sector, at a price specified in the agreement (or according to a price-setting procedure established by the agreement).

In the case of an inactive mine, the agreement would be more like an educational order, covering such possible areas as preliminary engineering/preparedness planning, completion of regulatory paperwork, and possibly even facility maintenance and acquisition of standby equipment. The agreement would also involve a purchase commitment like the one described above.

Likely Government participants in either type of agreement program would be FEMA (to direct the program), the Department of the Interior (to help identify potential requirements), and the General Services Administration (to administer the contracts with mine owners).

10.4 BENEFITS AND COSTS

The potential benefit of a standby purchase commitment agreement (i.e., a trigger order) is the impact on a mine owner's decision to increase production. If an agreement were activated well before market conditions would otherwise dictate a production increase, then the benefit could be considerable in terms of an early decision by a mine owner to increase output and of an incremental increase in materials held in the National Defense Stockpile. Both of these events would raise U.S. preparedness to meet emergency requirements. The cost of creating such agreements would be negligible, since the agreements would be generic in nature and would require virtually no planning (beyond consideration of the conditions/timing for activation). On balance, these agreements could result in substantial benefits and would cost very little to create and maintain. Activation of these agreements could involve a considerable cost; however, most or all of this cost could be recovered by reselling any materials acquired under the agreements.

The potential benefits of an agreement covering a mine reopening are considerable, but the costs of creating and maintaining such an agreement would also be considerable. As suggested earlier, preliminary preparation and ongoing maintenance of a heightened capability to reopen a mine could reduce the time required for reopening from three years to a little more than one year. The actual time saving and cost to achieve that saving would vary considerably from mine to mine and would have to be evaluated on a case-by-case basis to determine cost effectiveness. Clearly, the criticality of the material(s) involved and the anticipated supply and demand for the material(s) would also be important factors in any cost/benefit

determination. Finally, the cost of creating and maintaining an enhanced capability to reopen mines would have to be compared to other materials options (e.g., allocation, stockpiling, and substitution).

10.5 PROBLEMS

The biggest problems facing an initiative to create either a trigger order or an educational order program in the materials area are the reluctance to fund preparedness measures and the lack of understanding about the time required to reopen an inactive mine. In addition, without a standby funding mechanism and a consensus on when long-lead time preparedness measures should be activated, it is unlikely that standby mining agreements would be activated in a timely fashion.

With renewed initiatives to fund DPA Title III projects, the chances of funding preparedness measures have increased, but chances of funding materials-related initiatives may have been undermined by the findings of the recent stockpile report produced by the National Security Council. Because the costs of preparing these agreements would be modest compared to other initiatives such as stockpile purchases, they may be the most feasible materials-related initiatives in the current environment of constrained funding.

10.6 CONCLUSION

Despite the problems mentioned earlier, the potential benefits of the standby agreements discussed in this chapter are significant. Although the investments that would be

required could be large in comparison to preparedness investments for other sectors, these agreements would be relatively inexpensive compared to other proposals directed toward improving materials supply and would result in significant responsiveness improvements.

11. CONSTRUCTION

11.1 INTRODUCTION

In Volume 1 of this series, TASC examined Plan Bulldozer, which is a program established by The Associated General Contractors of America (AGC) to organize the construction industry's immediate response to disasters. In that report, we observed that elements of the Plan Bulldozer concept, in combination with standby agreements to construct key facilities, hold considerable potential for improving mobilization responsiveness. Such standby agreements could form the heart of a standby program to expand production capacity. The program might involve the following elements: (1) identification of expansion candidates; (2) development of expansion plans for specified facilities; (3) creation of standby agreements with construction contractors; and (4) maintenance by the contractors of the capabilities needed to fulfill the agreements. In this chapter, we examine how standby and voluntary agreements might be used to prepare for capacity expansion.

11.2 CAPACITY EXPANSION

Historical experience demonstrates that the existing defense industrial base can satisfy only a small fraction of the mobilization requirements generated by a major conflict. World War I and II saw annual production in such key industries as aircraft and ammunition increase by factors of 30 to 40 times pre-mobilization production levels. Even though defense

production levels are much higher today than before past mobilization periods, considerable expansion of capacity would still be needed to support production increases much beyond current levels.*

Defense producers typically maintain too little excess capacity to accommodate substantial production increases. While some producers could double or even triple current production rates, the capabilities of most producers would fall far short of such increases, and virtually no producers could increase production beyond these rates without converting or expanding capacity.

Construction of new capacity would be, therefore, an important element in any mobilization effort, but this element generally receives little attention in industrial responsiveness planning. Such planning focuses almost exclusively on existing production capabilities. Significant expansion of these capabilities would place a heavy burden on the construction and machine tool industries. While a number of programs exist to increase production of needed machine tools, virtually no preparations exist in the area of industrial plant construction.

A further element complicating planning for facilities expansion is the possibility that numerous conflicting construction requirements could strain industry capacity and require prioritization. A network of regional voluntary agreements might facilitate coordination of construction resources.

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*Very large production increases could even be needed in the event of a short conflict to replace the equipment destroyed and munitions consumed. Without a major industrial mobilization effort, it could take many years to rebuild U.S. military capabilities to pre-conflict levels.

11.3 STANDBY AGREEMENTS

A program to expand industrial capacity during a mobilization could be centered around standby agreements. These agreements might be entered into with either manufacturers or construction contractors. In the case of a manufacturer, the agreement would provide for creating and maintaining standby plans for expansion of an existing facility. Such plans would be a natural extension of preparedness planning efforts by defense producers. Current preparedness planning is generally limited to a producer's existing "brick and mortar" and does not address the possibilities for facility expansion. An expansion plan could address such issues as plant location, plant equipment, manpower, and so on.

A standby agreement with a construction contractor would take the planning process a step further by not only planning an expansion but contracting, on a standby basis, for the actual construction work required by an expansion effort as well. The participants in such an agreement would vary depending on ownership of the new plant or plant addition. If a new facility were to be Government-owned, the standby agreement would be between a Government agency and a construction contractor. If a new facility were to be privately-owned, the agreement would more natually be between the owning manufacturer and a construction contractor.

Because it would be a simple matter to add language concerning expansion planning to new defense contracts, implementing the first type of standby agreement would be a relatively easy and straightforward process. The only major issue in adding language to defense contracts concerning expansion would be funding.

By contrast, implementing standby agreements with construction contractors would be a far more complex exercise and would pose major problems concerning how expansion plans would be created, who would be parties to such agreements, and what would motivate contractors to enter into these agreements. An agreement with a construction contractor would involve not only planning by the contractor concerning standby construction resources to fulfill the agreement, but planning by a manufacturer, as well, concerning expansion requirements. A construction contractor would build from plans developed by (or with) a manufacturer. Therefore, rather than involve a simple two-party agreement between a Government agency and a construction contractor, a standby contract to construct additional plant space would have to involve a manufacturer. Whether the involvement is direct (e.g., the Government creates a standby agreement with a defense producer who, in turn, contracts on a standby basis with a construction contractor) or indirect (e.g., the Government takes a manufacturer's expansion plans and contracts directly with a construction contractor for standby capabilities to build from these plans), the process is far more complicated. Finally, since the standby construction plans might not fit in with existing contractual efforts between the Government and construction contractors, it might be more difficult to motivate these contractors to enter into standby agreements.

11.4 VOLUNTARY AGREEMENT

If experience in past mobilizations is a guide, one of the critical problems the construction industry will face could be prioritization of conflicting requirements. Especially during World War II, requirements for defense facilities expansion regularly conflicted with requirements for construction

support for expanding military facilities and infrastructure facilities, such as mines, metal production plants, and rubber plants. During World War II, the prioritization problem was complicated by the appointment of commodities "czars," each of whom viewed it as his responsibility to support his program as the highest priority for the war effort.

Similar problems could occur in future large-scale mobilizations. Especially large requirements could be generated to construct synthetic fuels production facilities on a crash basis (if oil import cutoffs were experienced or threatened), or fallout shelters, blast shelters, and other civil defense facilities.

Currently, there is no consensus on the organization and functioning of a central federal authority to set priorities for different defense programs. Indeed, a recent TASC report for FEMA suggests that this function is likely to evolve slowly over the course of an emergency rather than being in place at the outset.*

Even if such an organization can be put in place rapidly, it could probably do little more in the early stages of a mobilization than set rough priorities for expansion efforts. Significant conflicts and dislocations would be likely to occur. Voluntary agreements could provide a mechanism for Government and representatives of the construction and related industries to discuss capabilities and priorities for expansion projects. Because of the large number of construction contractors and the decentralized nature of the industry, a network of regional committees might be the most effective mechanism. This

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*See Reed, L.S., et. al., "Resource Management: An Historical Perspective," (The Analytic Sciences Corporation, 1984).

would permit authorities in each area to determine the most effective way to handle construction requirements in that immediate area.

Regional committees might be the most effective organization for this industry because most construction capacity conflicts would probably be local in nature. The regional committees could meet to review general program priorities established by federal authorities, determine where conflicts are likely to arise, and allocate the workload to balance construction capacity.

11.5 BENEFITS AND COSTS

In Section 11.3, we described two different types of standby agreements concerning plant expansion -- one simple and another far more complex. Not surprisingly, the more simple approach involves more limited benefits and costs. In terms of benefits, a standby agreement with a manufacturer concerning expansion planning could reduce or eliminate the time needed to design a new plant or plant addition and the inefficiencies likely to result from hurried, unplanned expansion efforts. Planning could also result in earlier ordering and delivery of equipment and hiring of workers for a new facility. The existence of facility blueprints and a plan of action to obtain needed equipment and manpower could cut several months from the time needed to bring a new facility into production. Even more time could be saved by preparations to comply with the patchwork of environmental and building regulations governing new construction in most areas. (Of course, regulatory waivers could serve to speed the construction process as well.) In terms of cost, planning would require funding. The funding could be

provided to a defense contractor either directly, as a separate contract cost, or indirectly, as an overhead cost. The actual benefits and costs of any specific planning effort would vary in relationship to the potential need for a particular plant expansion and the amount of planning needed to expedite such an expansion effort.

The second type of standby agreement -- one with a construction contractor to build needed facilities -- would involve additional benefits and costs. Such an agreement could lead to an earlier construction start and a more coordinated and efficient construction effort. However, these benefits would depend heavily on the degree to which a standby agreement has required a contractor to maintain the needed construction capabilities, has encouraged the contractor to conduct preparedness planning, and would require the contractor to give the standby commitment priority treatment over other ongoing projects. In the absence of such requirements and planning, a standby agreement with a construction contractor would probably offer little or no benefit. Moreover, expedited construction alone would not lead to earlier production, if plant equipment and staffing needs could not be shortened to match the savings in construction time. It is quite possible that needed construction could be completed, even without prior planning, before needed equipment could be produced.

The cost of maintaining an agreement with a construction contractor would depend on a number of factors:

- If the Government were to contract directly with construction contractors, Government effort would be required to identify expansion candidates, arrange for expansion planning, and create and maintain the standby agreements

- If the Government were to require defense contractors to enter into such agreements with construction contractors, much of the preparedness burden would be shifted to the defense contractors, but the cost of this effort would undoubtedly still pass through to the Government in either direct or indirect contract costs

- If special incentives were needed to encourage construction contractor participation in these agreements, the Government would, again, incur the cost.

The voluntary agreement discussed in Section 11.4 could have significant benefits with very low costs. A principal question would be whether such agreements should be established in peacetime, whether on a standby or active basis. Other than general preparedness planning, which could probably be done without a voluntary agreement, there would probably be little benefit to activating such a voluntary agreement in peacetime. However, because this agreement might be especially important in the early stages of an emergency, it may be beneficial to establish standby voluntary agreements in peacetime.

11.6 CONCLUSION

The standby agreement mechanism appears to be well suited to improved planning for facility expansion. It would be a simple matter to provide for expansion planning in defense contracts, and such planning could cut months from the time needed to bring new plant space on-line, at a minimal cost to current production efforts.

By contrast, the standby agreement approach appears to be less well suited to the actual purchase of construction services. To begin with, it is not clear that shortening

plant space construction times would lead to earlier output from new facilities. In many cases, new facilities could be built without prior planning before equipment for these facilities could be produced. Second, the creation of standby agreements between the Government and construction contractors is complicated by the need to obtain plans for facilities to be built. The most likely candidate to produce such plans would be current defense producers whose facilities would be expanded or duplicated during an emergency. This introduces the possible need for third-party participation in some or all of the agreements. Third, the creation of standby agreements between the Government and construction contractors is further complicated by the fact that most plant construction services are contracted for by defense producers directly. While this could change during an emergency (with the construction of more Government-owned facilities), the relatively limited nature of peacetime contracting between the Government and construction contractors offers limited opportunities to add standby agreement language to current Government construction contracts.

The voluntary agreement could be useful in coordinating use of construction industry assets during a major mobilization or after a major disaster. Creation of local or regional agreements would probably be the most effective way to ensure full participation and adequate attention to local dislocations and overloads.

12. TELECOMMUNICATIONS

12.1 INTRODUCTION

Traditionally, defense telecommunications services, like commercial telecommunications, have been dominated by AT&T. Through its integrated network of research and development, manufacturing, long distance, and local telephone companies, AT&T dominated the commercial market. Because of the Bell System's reputation for reliability and its ability, as a regulated utility, to provide excess capacity and comprehensive services, DoD has found, like most telecommunications users, that AT&T provided a high quality of service. As one study commented:

> Ma Bell effectively controlled the long-haul national network and most of the local exchanges. Where she did not control, her technical standards, practices, and engineering principles were operative, and her established agreements with the Independents made coordination automatic. AT&T was able, and willing, to act well beyond the normal contractor's role in providing priority service to Defense users.*

Telecommunications technology and the structure of the industry have been changing rapidly in recent years, confronting emergency planners with a communications environment much different than it was in the past. New technologies, new competitors for long distance communications services, and the

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*Bolling, George H., "AT&T: Aftermath of Antitrust," Washington, National Defense University Press, 1983, p. 32.

increasing overlaps between telecommunications and data processing would have inevitably caused major changes in the structure of the industry. On top of these changes, the 1984 divestiture of AT&T into eight separate companies has irreversibly altered the industry.

Where AT&T once provided nearly universal, end-to-end telephone service, there is now an industry made up of many independent Bell and non-Bell local phone companies and nearly a dozen major competitive suppliers of long distance services. Where AT&T's manufacturing subsidiary, Western Electric, once dominated supply of equipment, there is now an increasing number of equipment suppliers. And, where DoD could once rely on AT&T to prescribe standards for interoperability, to provide most telecommunications capabilities, and to respond quickly to emergency service requirements, it now faces a much more complex environment.

A study of the national security implications of the new industry structure observed that:

> What this means is dissolution of the vertically integrated corporate structure that enabled AT&T to be almost everybody's manager, engineer, integrator, controller, restorer, and maintainer for telecommunications services. These important functions represent manpower and expertise that must somehow be replaced, and they won't come cheap. More crucial than cost, however, is the loss of a single organization in the private sector with the clout and resources necessary to assure delivery of sustained telecommunications services from user to user.*

*Ibid., p. 2

Possible consequences of the new structure for DoD and other national security agencies include:

- Increased difficulty in specifying and contracting for telecommunications services and equipment
- Loss of excess capacity and reduction of part/component inventories
- Increased pressure to procure equipment offshore (for maximum efficiency) and diminished visibility of foreign dependencies (due to the increasing number of sources)
- Increased problems with conflicting and overlapping emergency production demand on equipment suppliers, again due to the increasing number of industry purchasers of equipment
- Erosion of quality and interoperability standards
- Increased complexity in identifying and correcting network problems
- Increased difficulty in -- and heightened need for -- planning and coordinating network, capacity, service, and maintenance issues among the newly-restructured industry
- Increased risk of antitrust problems due to the need to coordinate issues among different companies who are in a highly competitive environment.

12.2 TELECOMMUNICATIONS PREPAREDNESS ACTIVITIES

The Government has initiated a number of activities to improve planning and coordination of telecommunications resources. Waivers have been obtained to allow AT&T and the

now-separate Bell Operating Companies to continue providing full end-to-end service for some of the most critical military communications systems. Under the auspices of a new Executive Order 12472 (issued in April 1984), several new coordinating organizations were formally established, including:

- The President's National Security Telecommunications Advisory Committee (NSTAC), which fosters joint industry-government telecommunications planning and identifies critical issues for resolution
- The National Coordinating Center (NCC), which includes industry representatives who work with the federal National Communications System (NCS) to plan and coordinate telecommunications preparedness activities.

Although the NCC carries out some of the functions of a voluntary agreement, it does not appear to have formal antitrust protection. Instead, Executive Order 12472 provides for periodic monitoring by the Department of Justice, to review and help avoid possible antitrust problems.

Telecommunications companies receive some measure of protection through Section 706 of the Telecommunications Act of 1934, which provides that --

> During the continuance of a war in which the United States is engaged, the President is authorized, if he finds it necessary for the national defense and security, to direct that such communications as in his judgment may be essential to the national defense and security shall have preference or priority with any carrier subject to this chapter. He may give these directions at and for such times as he may determine, and may modify, change, suspend, or annul them and for any such purpose he is authorized to issue orders directly, or through such person or persons as he designates for the purpose, or through the Commission. Any

> carrier complying with any such order or direction for preference or priority herein authorized shall be exempt from any and all provisions in existing law imposing civil or criminal penalties, obligations, or liabilities upon carriers by reason of giving preference or priority in compliance with such order or direction. (Emphasis added.)

The Act would give complete protection from antitrust charges during wartime for actions to execute Presidential orders. In addition, the Act, together with the consultation process established under Executive Order 12472, provides a significant measure of protection for cooperative planning efforts in peacetime. As a practical matter, even if no formal protection exists, the Department of Justice would find it almost impossible to prosecute successfully against any actions about which it had informally advised the participants. Thus, there is virtually no risk of federal prosecution as long as participants stay within informal guidelines prescribed by the Justice Department.

However, there could still be some legal problems associated with telecommunications preparedness planning. One potential problem is the risk of antitrust charges brought by third parties. Although the procedure requiring consultation with the Attorney General provides significant protection against prosecution by the Federal Government, third parties might still be able to claim an injury even if the Attorney General had approved the activities. This risk may be especially serious in the telecommunications industry, given the recent history of intense antitrust litigation.

Additionally, in an actual emergency that did not involve a declaration of war (that is, before the protections of Section 706 were triggered), the current, less formal

consultation process might prove to be more cumbersome and confining than a voluntary agreement. Although it would clearly be more difficult to establish the voluntary agreement, once established it might provide more certainty to planners that they would be able to execute their plans in an emergency. The following section considers ways that standby and voluntary agreements might be used in this industry.

12.3 AGREEMENTS

Several standby and voluntary agreements might help Government and industry resolve supply and service problems. In considering applications of these programs, it may be useful to consider the telecommunications industry in two different ways. In one sense, the preparedness problem confronting the telecommunications industry is similar to the problems of many other industries. During an emergency, requirements for output (both equipment -- from suppliers, and services -- from carriers) could increase substantially. Like many other industries facing increased demand, the telecommunications industry could suffer from foreign source supply reductions, overlapping and conflicting demand on suppliers, conversion/expansion requirements, skilled labor shortages, resource shortages, contracting problems, inadequate inventories of parts and components, and similar problems.

The more competitive telecommunications environment fostered by deregulation and divestiture of AT&T could magnify the potential impact of some of these problems. For instance, increased competitive pressure could encourage more foreign sourcing (to reduce costs) or reduced inventories of repair parts. Similarly, the growing diversity of the industry could magnify the preparedness planning problem by creating more

sources to create demands on suppliers and by obscuring the foreign dependency problem.

In other ways, the industry differs significantly from other essential industries. The new structure of the industry imposes substantial coordination problems that did not exist until recently.

To the extent that the industry is similar to others, methods similar to those discussed in earlier chapters might be applied to improve its emergency responsiveness. For example, a voluntary agreement in the form of a Telecommunications Industry Integration Committee (made up of both carriers and equipment manufacturers) could be used to identify production requirements, capabilities, and bottlenecks; expedite identification and replacement of foreign sources; provide for exchanging technical information on manufacturing processes, products, and component or equipment inventory availability; and identify ways to resolve production bottlenecks in supplier plants. (See Chapter 1 for a discussion of the structure and operation of integration committees.)

Standby agreements could also be used to provide assurance of increased equipment supplies or services in an emergency. DoD (or any other Government agency requiring telecommunications services) could use surge option clauses and equipment trigger orders to identify sources of equipment or services that might be needed in an emergency, and guarantee timely responsiveness to emergency needs. A surge option clause might also be used to identify maintenance and repair sources and avoid substantial administrative delays in providing these services. As with other surge option clauses, the planning underlying the agreement might be as important in ensuring improved responsiveness as the agreement itself.

Defining likely ranges of requirements and activation procedures would be two key elements of this planning; standby funding authorities would also have to be identified.

A standby agreement modelled on the Civil Reserve Air Fleet (CRAF) program could also be developed to encourage industry responsiveness to defense telecommunications requirements. Under the CRAF program, airlines receive shares of the peacetime military passenger and cargo charter business in proportion to their willingness to commit aircraft to emergency military needs. (See Chapter 6 of Volume 1 for a discussion of the CRAF program.) Similarly, DoD, NCS, or another agency could structure a program that gave suppliers consideration for a share of the substantial defense telecommunications market in return for their willingness to perform preparedness planning, maintain necessary standards, or commit resources to defense needs in an emergency.

A second voluntary agreement could also be formed by telecommunications companies to resolve peacetime telecommunications preparedness planning, service bottlenecks, and coordination problems. The new structure of the industry can pose a substantial problem in coordinating telecommunications services. A voluntary agreement might be able to improve this coordination process. This agreement could address network operational and planning issues; maintenance, repair, and restoration; and vulnerability problems. With formal antitrust protection, participants could take actions that would entail too great a risk of antitrust prosecution or competitive disadvantage without such protection. For example, participants might agree to favor domestic suppliers, pool resources, maintain interoperability standards, and perhaps even maintain services and capabilities that competitive pressures might otherwise inhibit.

12.4 POLITICAL CONSIDERATIONS

There would probably be few Government political problems in establishing a program of voluntary and standby agreements in this industry. It has been generally recognized that national security telecommunications requirements require special consideration in the new industry environment. The telecommunications industry has also recognized the importance of emergency planning, and has been generally supportive of Government-sponsored preparedness planning efforts.

Although the CORE-type standby agreement would conflict with the new, more competitive environment for defense contracting, the program would be permitted under exception 3 to the Competition in Contracting Act. The importance of preparedness planning for telecommunications, the new preparedness challenges posed by the new industry structure, and the precedent of the CORE program could all be cited in support of the agreement.

Because of the new competitive nature of the industry, some companies might be reluctant to participate fully in the program outlined in the previous section. There might be considerable concern that the voluntary agreement would affect the competitive posture of the industry. Any voluntary agreement that operates in peacetime can raise concerns about issues such as protection of trade secrets and competitive conditions.

Some of this concern would be alleviated if the voluntary agreements were kept on standby and only activated during an emergency. If there were concerns about competitive practices, the Telecommunications Industry Integration Committee could probably be maintained on standby for use only

during emergencies. However, the second voluntary agreement described in Section 12.3 would probably be most useful if it operated on at least a limited basis in peacetime.

Several considerations could increase the willingness of industry to participate in such a program. Participation might be made a precondition for peacetime telecommunications contracts under the CRAF-type agreement described in Section 12.3. Additionally, the authority under Section 706 of the Telecommunications Act for the Government to exercise full control over telecommunications services should provide a substantial incentive for industry to cooperate in efforts to resolve preparedness problems, to avoid more direct Government controls.

12.5 CONCLUSION

Telecommunications services are increasingly important for national security, and the emerging industry structure has complicated the problem of planning and maintaining reliable telecommunications services. Both Government and industry are already making significant efforts to improve the reliability of telecommunications planning for national security.

Standby and voluntary agreements could both be used to provide improved responsiveness in this industry. Standby agreements and an industry integration committee (comprising both manufacturing and service companies) would be relatively noncontroversial and could respond to a number of supply and service problems. They could allow a concerted industry-Government effort to identify and resolve many likely production and service bottlenecks.

The second voluntary agreement discussed in this chapter might be more likely to affect the peacetime structure and competitiveness of the industry. It might also overlap with ongoing planning and coordination activities sponsored by the NSTAC. Nevertheless, the added measure of antitrust protection it would provide might permit a range of activities that would not be possible in the absence of the agreement.

13. FINANCIAL SERVICES

Business, real estate, and consumer credit is provided by several thousand banks, savings and loan associations, insurance companies, and other financial institutions. During a mobilization, significant changes can occur in the economy. If national policy makers decide to expand defense facilities, additional capital will be required to construct these facilities. Government expenditures will also increase. Increased employment and overtime in defense-related industries could increase consumer purchasing power. Especially if this increased purchasing power is accompanied by curtailed production of consumer durables and other nonessential items, signifficant inflation could result in consumer industries as "more dollars are chasing fewer goods."

Controls over business, real estate, and consumer credit have been a standard component of federal economic stabilization programs in past mobilizations. These controls had several purposes:

- To restrain the growth of debt and debt-financed consumption and investment in order to restrain inflation
- To support monetary policies and production curtailment decisions by reducing demand for nonessential items
- To support mobilization goals by making investment capital more readily available for expansion of defense production facilities

- To provide a backlog of consumer spending demand and nonessential public works to stimulate the economy at the end of the emergency, when defense spending would be tapering off.

The most prominent economic stabilization measures enacted in past mobilizations were direct federal controls. For instance, during the Korean conflict, Congress temporarily authorized the President (under the authority of the Defense Production Act) to implement wage-price controls and controls over consumer and real estate credit. Present planning assumptions reject the validity of these types of direct federal economic controls.

During the Korean conflict, the Federal Government also administered a relatively obscure voluntary credit restraint program under the authority of Section 708 of the Defense Production Act. Under this program, financial institutions formed national committees to establish general screening criteria for business loans and local committees to which individual financial institutions were asked to submit loans for advisory opinions as to whether they should be approved or deferred. State and local governments were also asked to defer certain types of bond issues for the duration of the emergency. (This program is described more fully in Section 4.2 of Volume 2 of this series.)

This chapter briefly reviews the accomplishments of that program and the feasibility of establishing a similar program in future emergencies.

13.1 BACKGROUND

Letters of invitation to participate in the Voluntary Credit Restraint Agreement were sent to banks, savings and loan associations, and other financial institutions on March 9, 1951. Its purpose was to assist in stabilizing the economy and controlling inflation by limiting the growth of credit and by channeling credit from nonessential to essential, defense or defense-supporting uses. While they recognized that the program was voluntary, and therefore could not be completely effective, its proponents -- financial institutions and the Federal Reserve System -- believed that a voluntary program could help restrain nonessential borrowing. The sponsors recognized that conventional lending criteria would be ineffective. A credit restraint program would have to involve screening loan applications not only for credit-worthiness, but also as to purpose. It was also felt that individual credit restraint initiatives by financial institutions would be ineffective because prospective lenders could "shop around" for loans. Concerted action with consistent guidelines was needed.

Besides stabilizing the money supply, controlling the growth of debt, and channeling capital to defense-related projects, the program was considered to have several other benefits. First, it would facilitate materials-control programs by restraining hoarding and speculative inventory growth. Second, by deferring a large number of worthy projects, it would create a backlog of private investment and public works projects that could serve as a healthy stimulus at a later date, when defense spending inevitably declined.

Voluntary action was considered necessary for a number of reasons. First, it was argued that across-the-board regulations, as were issued for consumer and real estate credit, would be ineffective. The chairman of the national committee of the credit restraint program testified that, whereas consumer and real estate credit controls dealt with a large volume of relatively uniform transactions,

> ...the voluntary credit restraint program deals with a great multitude of transactions which are tailor-made by the institutions to the needs of the borrowers. They are not uniform on the whole, and I am very sure it would be quite impossible to put them under a regulation.*

More fundamentally, however, the Defense Production Act did not authorize mandatory controls of business credit. Title VI of the DPA authorized mandatory controls only for consumer and real estate credit. If mandatory controls over business credit had been desired, new authority would have been necessary.

In its statement of principles, the committee stated that the purpose of the agreement was to assist financial institutions --

> ...to help maintain and increase the strength of the domestic economy through the restraint of inflationary tendencies and, at the same

*Testimony of Oliver S. Powell, Member of the Board of Governors, Federal Reserve System, and Chairman, National Commitee, Voluntary Credit Restraint Program, at hearings before the Subcommittee on General Credit Control and Debt Management, Joint Committee on the Economic Report, U.S. Congress, March 19, 1952, pp. 469-470.

time, to help finance the defense program and the essential needs of agriculture, industry, and commerce.*

To accomplish this purpose, the Committee regarded the following types of loans as being proper:

- "Loans for defense production, direct or indirect, including fuel, power, and transportation
- "Loans for the production, processing, and orderly distribution of agricultural and other staple products...
- "Loans to augment working capital where higher wages and prices of materials make such loans necessary to sustain essential production, processing, or distribution services
- "Loans to securities dealers in the normal conduct of their business or to them or others incidental to the flotation and distribution of securities where the money is being raised for any of the foregoing purposes."+

Two types of loans specified as undesirable in the initial statement were loans to retire or acquire corporate equities in the hands of the public and speculative investments.

The purpose of the national committee was to formulate general lending statements and policies that could be applied by financial institutions. To carry out its work, the national committee appointed a total of 43 regional subcommittees to

*"Program for Voluntary Credit Restraint," Federal Reserve Bulletin, March 1951, p. 263.

+Ibid., p. 264.

pass information on to individual financial institutions and to consult with these financial institutions on individual loan applications.

To help local financial institutions evaluate the merits of loan applications, the national committee issued a number of general policy statements. Its first statement was merely a general statement of principles, but later bulletins prescribed criteria for specific types of loans. Lending areas selected for bulletins were those where actual or anticipated credit expansion was substantial, statutory credit restraints did not apply, and the participating financial institutions were dominant lenders.

In 1952, as opposition to economic controls increased, the Credit Restraint Program was terminated. Although no definitive judgments can be made, it appears that the program was effective. Statistics summarized by the committee showed that loans of the types discouraged by the program declined considerably in the face of increased overall economic activity. Member financial institutions reported that large numbers of loan applications were deferred after negative advice from local committees. Defense-supporting industries, on the other hand, obtained large increases in capital. Thus, it appears that the goals of the credit restraint program were largely accomplished.

13.2 POSSIBLE APPLICATIONS

A voluntary approach similar to the Voluntary Credit Restraint Program might be an effective way to help finance facilities expansion and restrain growth of debt in a future mobilization. Although general application of monetary and

fiscal policy could probably be effective in controlling aggregate demand for credit, a voluntary credit restraint program would undoubtedly be more effective in supporting more direct mobilization goals such as channeling capital to essential projects and deferring nonessential projects. As with the Korean-War program, the cooperation of financial institutions would be needed to discriminate between desirable and undesirable loans.

One key question would be whether such a program should also establish criteria for consumer or real estate loans. During the Korean conflict, these types of loans were subject to mandatory controls rather than a voluntary program.

For meeting some of the credit control objectives mentioned earlier, consumer and real estate credit restraint would not be needed. The objectives of restraining inventory growth (hoarding of materials) or deferring nonessential business borrowing could be accomplished without applying lending criteria to consumer or real estate loans. However, because of the overwhelming growth of consumer credit in recent years, a program aimed at restraining only business credit might not be very effective at restraining overall growth in debt or in freeing up capital for defense expansion.

Using the same approach as the past credit restraint program, a national committee could issue general policy guidance for implementation by local committees and financial institutions. Criteria that might be established could include:

- Reducing credit lines or required higher minimum monthly payments on credit cards or lines of credit
- Limiting the duration of loans or requiring higher down payments for cars, real estate, and other major loans

- Limiting the offering of new credit cards and lines of credit to consumers
- Establishing higher "credit-worthiness" standards for new loan applications.

While it would probably be easier to establish general criteria for consumer and real estate loans than business loans, such a program might prove very difficult to police. One limit of such a program is that it would probably be impossible to screen anything but the largest consumer loan applications as to purpose. Instead of discriminating between desirable and undesirable loans, this element of the program would probably concentrate, for the most part, on reducing aggregate demand. Rather than focusing on establishment of regional and local committees, the principal activity with regard to consumer and real estate credit might be establishing general leading principles and persuading financial institutions to subscribe to these principles. Nevertheless, such a program could be beneficial if policymakers considered it important to reduce credit demands.

Logically, such a program would be sponsored by the Federal Reserve System, proponent of the 1950s program. There would probably be little or no need for such a program on an active status in peacetime; indeed, because credit restraint measures would probably be needed only in a fairly large mobilization, it might be possible to wait until the early stages of an emergency before beginning the process of creating the agreement. Before an emergency, it would probably be sufficient to prepare some initial plans, to identify likely participants and objectives, etc.

13.3 POLITICAL FEASIBILITY

In judging the political feasibility of this type of agreement, two questions must be considered:

- Would additional legal authority be required?
- Would such a policy initiative be politically acceptable?

The following sections discuss these questions.

13.3.1 Legal Authorities

With regard to the first question, we believe that the DPA would permit establishment of a voluntary agreement for credit restraint as long as it was implemented for the purpose of facilitating mobilization or defense preparedness. That is, the DPA probably would not authorize voluntary credit controls merely to restrain peacetime inflation, but it would authorize such a program for defense preparedness purposes.

A voluntary agreement like the 1951 voluntary credit restraint program could easily be justified under the current authorities. This program was created to support the defense preparedness effort, not only by restraining inflation, but also by helping to channel capital to defense-related purposes; by restraining speculation and commodity hoarding; by limiting nonessential expansion and construction projects; and by helping to channel materials, manpower, and other resources toward the defense program. It could be, and was, defended as an integral component of the mobilization strategy, above and beyond its contributions to economic stabilization.

It is important to note that the 1951 credit restraint program was authorized under Section 708 of the DPA, not under Title VI, which provided authority for mandatory controls over consumer and real estate credit. Title VI never provided authority for regulation of business or state and local government borrowing, so the repeal of Title VI in 1953 had no direct impact on the viability of a voluntary credit restraint program.

DPA authority for a voluntary consumer or real estate credit restraint program would not be as clearcut, because such a program would not as clearly support direct mobilization goals (e.g., restraining hoarding and channeling capital to defense expansion). However, if it could be shown that consumer and real estate credit restraint measures were needed to make capital available for defense expansion, this type of program could probably be justified.

13.3.2 Political Feasibility

During both World War II and the Korean conflict, the entire economic controls program was highly controversial. A voluntary credit restraint program would avoid much of the controversy associated with the mandatory controls because it would be more flexible and would remain a voluntary program. As a private sector initiative, it might not be as objectionable to anticontrols economists as a mandatory program would be. Advocates of more direct Government action, on the other hand, might accept it as the only politically feasible alternative in the absence of a pro-controls consensus, Administration support, and new legislative authority.

Because it would have a more visible impact on consumers, a credit restraint program aimed at controlling

consumer and real estate lending might be more controversial than one focused solely on business lending. Proponents would have to decide whether to include these elements in a voluntary agreement.

13.4 CONCLUSION

Despite the risk of political controversy, it appears that a voluntary credit restraint program could be an important way to help support economic goals during mobilization. Although political opposition led to its premature termination, the 1950s program appears to have been successful in restraining credit demand for nonessential purposes and channeling capital to defense production. Such a tool could be particularly timely as a private sector initiative to replace planning for direct economic controls.

The alternative would be to let the market adjust to increased demand for capital, either by increasing the money supply or by raising interest rates. Either approach could hinder a defense buildup. A private sector initiative could provide significant economic support for defense expansion goals. In the absence of legislative authority and a consensus in favor of direct controls, it appears to be an idea that merits further consideration.

14. ELECTRIC UTILITIES AND POWER TRANSFORMER/CIRCUIT BREAKER PRODUCTION

14.1 BACKGROUND

A continuous supply of electric power is vital to the functioning of an industrial economy. Without reliable electric power, defense production and military operations would be immediately affected.

Although some electricity is produced by hydroelectric, diesel, or gas turbine plants, the vast majority is produced in centralized, thermal generating stations which generate electricity by consuming oil or gas, coal, or nuclear fuels. Electricity is distributed through extensive local and regional distribution networks. Of critical importance in these distribution networks are transformers (which are used to raise or lower the voltage of electric power for transmission, consumption, or transfer between interconnected power systems) and circuit breakers (which initiate or interrupt the flow of electric power).

Extra High Voltage (EHV) power transmission systems are especially important because they are the most efficient means of transferring large blocks of electric power long distances from the generating source. EHV power systems also often provide the most efficient means of interconnecting large neighboring utility systems. These connections allow utilities to share resources for improved efficiency and assist each other when abnormal conditions (loss of generation or transmission facilities) occur. They have become increasingly

important as the industry has moved in the direction of more regional interconnections (to save costs and improve reliability) and larger generating stations, often colocated with a fuel supply at a considerable distance from the ultimate demand.

Both generating stations and key nodes in the electric power distribution system may be highly vulnerable to disruption by natural disaster or terrorist actions. Loss of key generating facilities or distribution nodes could seriously disrupt the supply of electric power in local areas or across broad regions.

Extra high voltage power circuit breakers and transformers are of particular concern for national security because of their vulnerability to disruption and their importance to the power distribution system. This vulnerability is magnified by several factors:

- Electric utilities generally do not keep spare equipment of this type because they are very expensive and local regulatory agencies are reluctant to approve expenditures for standby equipment
- There is a very long lead time to produce the equipment (in excess of a year)
- The industry is subject to increasing foreign dependency as more production capacity is replaced by offshore sources
- There is relatively little automation in the industry. The workforce is highly skilled and new workers are not being trained in sufficient quantities to replace the current generation of workers.

In 1972, the General Electric Company filed an application for import protection under Section 232 of the Trade Expansion Act.. This Act permits industries to request import protection on the grounds that maintaining a domestic industry is essential to national security. This application was rejected, largely on the basis that sufficient domestic capacity existed, and was likely to continue existing, to meet any foreseeable requirements.

The sector has continued to decline in the past 14 years. Whereas at least seven domestic companies produced either EHV transformers or circuit breakers (or both) in 1972, only three domestic producers remain at present. The industry has been damaged not only by increasing foreign penetration but also by the generally declining condition of the electric utility industry. The electric utility industry is in poor economic health at present because of static growth in demand for electric power, over-expansion of electric power facilities, and financial and operating problems with nuclear power plants. As a result of both reduced demand and financial difficulties, electric utilities have scaled back investment plans.

Voluntary and standby agreements may be of some benefit in helping to improve the security of electric power generating and distribution facilities and the economic health of the production sector. The following section considers some possible applications of these techniques.

14.2 AGREEMENTS

It might be feasible to use standby and voluntary agreements, and related planning actions, in a variety of ways

to improve the security of electric power supply. In identifying potential applications, it would be important to determine the fundamental objective of the agreement. Some actions would improve the security of electric power distribution systems without necessarily improving the health of the EHV equipment producers. Other activities could improve the economic condition of this production sector, but might have no immediate impact on the security of power supplies. While these problems are not entirely unrelated, the relative importance of each objective could have a major influence on the options the Government selects. The following sections discuss programs that might address each of these problems.

14.2.1 Economic Health

Addressing the economic health of the EHV equipment production sector may be the most difficult problem. Voluntary agreements or other cooperative actions by industry and Government might be used in several different ways.

A voluntary agreement could allow EHV equipment producers to undertake cooperative research and development, production, and marketing activities. (Such an agreement would be similar to the machine tool voluntary agreement described in Chapter 9.) As with the machine tool agreement, a voluntary agreement of EHV equipment producers could allow them to pool their resources and expertise. Although such an agreement could easily be justified under the DPA, it is doubtful that it would be as beneficial to this industry as the machine tool agreement could be.

Creating more demand for the products of the industry might be a more likely way to improve its health. For example,

electric utilities could agree, with the concurrence of state regulatory agencies, to buy only American-made equipment or to favor American-made products. Another possibility would be for electric utilities to pool their resources to buy spare EHV equipment. This action would not only create short-term demand for the industry's output, but would also improve disaster preparedness by providing replacement equipment.

It is not clear that either of these activities would require a voluntary agreement because they might not raise antitrust issues. However, both would require concurrence of state regulatory agencies, who are traditionally reluctant to approve investments in "unneeded" capacity.

The most feasible approach could be a voluntary agreement formed of producers and utility companies to consider a broad range of preparedness options and recommend solutions to federal and state officials. The combined support of such an Electric Industry Preparedness Committee and federal preparedness planning agencies could help identify and prioritize remedial options and influence the decisions of state regulatory agencies.

14.2.2 Long-Term Responsiveness

Several types of standby agreements with the EHV equipment sector could reduce lead times for replacing or supplementing EHV equipment in an emergency. Trigger orders and educational order-type contracts could help to reduce the lead time for this equipment by a matter of months. Trigger orders might be especially useful, because EHV equipment is typically produced only in response to orders. If trigger order instruments were placed with producers, they could begin producing equipment early in an emergency with assurance that

they would be reimbursed by the Government if no electric utility purchased the equipment. Determining agency responsibilities and funding mechanisms would be the only problem, although this could be resolved if adequate funding could be provided.

An educational order-type contract could also be useful if it provided funding for the producer to stock inventories of materials and components. Purchasing component inventories would be less expensive than purchasing entire spare transformers or circuit breakers and could reduce lead times to produce replacement equipment by several months. A combination of these two methods could probably reduce production lead times by six months or more.

The principal limitation of these lead time reduction measures is that they could not provide immediate replacement for equipment that is damaged or destroyed in a natural disaster or terrorist incident. However, if funds for preparedness investments were limited, these programs would represent some of the few feasible ways to reduce the delay in producing replacement equipment without the expense of purchasing entire standby equipment end items.

14.2.3 Short-Term Responsiveness

Long-term responsiveness measures cannot provide continuity of electric power service. Generally, the standby agreements described in Section 14.2.2 would be able to reduce lead times to produce complex EHV equipment by a matter of months, but they would not be able to maintain continuous service in the wake of a catastrophic equipment failure except under very unusual circumstances.

There appear to be only two ways to provide increased assurance of continuous or near-continuous service: providing for spare equipment that can be installed rapidly to replace losses or improving the security of existing equipment and facilities. Potential ways to provide for spare equipment were discussed in Section 14.2.1.

Standby agreements with electric utilities could be used to increase the security of electric utility generation and transmission facilities. An educational order-type instrument could be used to perform preparedness surveys of key facilities, identify vulnerabilities, and define necessary security measures. These security measures might require investments in upgrading facilities or equipment or they might involve only identification of actions that should be taken to upgrade security during an emergency and operating procedures for implementing these actions. Especially if preparedness investment funds were limited, the latter course of action may be especially promising. A preparedness survey could identify the key nodes that are most vulnerable, identify actions to upgrade security, and identify conditions which would cause the increased security to be implemented. The utilities could then sign an agreement with federal or state authorities defining what measures would be implemented, emergency conditions that would trigger the plans, notification procedures, and, if required, funding procedures.

As with many other standby agreements, the principal value of this type of agreement would be the planning and identification of vulnerabilities that supports development of the agreement. Although this planning would entail some additional cost (which would have to be either reimbursed by the Federal Government or approved by regulatory authorities), the cost would be relatively modest.

14.3 PROBLEMS

There are several potential problems with the approaches outlined in this chapter. First, the proposed standby production agreements would be limited by the underlying economic condition of the EHV equipment producers. The agreements would be of steadily less value if the industry continued to deteriorate, and they could do little to arrest this deterioration.

Moreover, most of the possible agreements would require the concurrence of state regulatory agencies, who have traditionally looked with disfavor on investments in idle capacity and preparedness planning.

Finally, there is potential for significant customer-supplier conflict. Although the EHV equipment suppliers would certainly agree that it is important to preserve a domestic production base, it is not as certain that their customers -- electric utilities -- would share this concern. (It is significant to note that 5 of the 16 statements filed in opposition to the 1972 trade protection application were filed by domestic electric utilities. Ten of the remaining 11 negative comments were filed by foreign producers or governments.)

Therefore, while electric utilities might support immediate response measures if they were persuaded that the security problem was serious, it is not certain that they would support measures to protect the domestic producers, especially if it raises the cost of equipment.

14.4 CONCLUSION

To a greater extent than in many of the other programs described in this report, the process of establishing a preparedness planning program related to this industry could be the principal short-term benefit. While the preparedness problems are relatively easy to define, they are complex and will be difficult to solve.

Although no single approach is likely to solve the problems discussed in this chapter (economic health of an important production sector and security of electric power systems), the involvement of manufacturers and utility companies in addressing the problems could be a first step toward solving them. The possible uses of standby and voluntary agreements discussed in this chapter may provide a basis for a concerted Government-industry program to identify and resolve these serious national security problems.

15. CONCLUSIONS

In this report, we have presented brief "think pieces" on the possible applications of voluntary or standby agreements in 15 specific industries. Rather than develop a prioritized list of the best or most likely candidates for voluntary and standby agreements, we have examined a broad range of possible applications in order to present a perspective on the variety of agreements that could be created. Tables 15-1, 15-2, and 15-3 show the range of applications we considered.

15.1 POSSIBLE USES

This report suggests that implementation of standby and voluntary agreements could make significant improvements in industrial preparedness for a wide range of emergencies. Wider application of traditional approaches would be one way to achieve these benefits. These include:

- Use of voluntary agreement authorities to establish integration committees, a device used in past mobilizations by most defense production programs to speed conversion of new producers and identify and solve production bottlenecks. Integration committees could be used in a wide range of emergency situations
- Use of the trigger order concept (such as the current Machine Tool Trigger Order Program) to orchestrate planning of requirements and provide contingent purchase agreements for other materials, components, or equipment that would be needed in an emergency

TABLE 15-1

POSSIBLE APPLICATIONS - ITEMS AND MATERIALS

INDUSTRY	AGREEMENTS
Tactical Missile	Weapon program integration committee to coordinate conversion and resolve bottlenecks Standby agreement to reduce testing requirements
Helicopter	Weapon program integration committee to coordinate conversion and resolve bottlenecks Surge option with existing producer Educational order to help convert new producer
Forging	Standby agreement to provide for transfer of dies Voluntary agreement to identify and resolve bottlenecks
Semiconductor	Voluntary agreement to help replace foreign sources Standby agreement to identify new production or test methods
Mining	Standby purchase commitments with active mines Educational order with inactive mine (engineering/planning, paperwork, maintenance)

TABLE 15-2

POSSIBLE APPLICATIONS - FACILITIES AND EQUIPMENT

INDUSTRY	AGREEMENTS
Construction	Standby agreement with defense contractor or construction contractor to provide standby expansion plans Regional voluntary agreements to prioritize construction requirements
Construction Machinery	Standby purchase commitment for parts or components Educational orders to promote conversion Industry voluntary agreement to resolve conversion and civilian production issues
Electronics and Electronic Test	Educational orders to prepare test equipment producers Test equipment trigger order program Voluntary agreement to coordinate conversion, resolve bottlenecks
Machine Tool Retrofit	Trigger orders with manufacturers of controls and retrofit kits Trigger orders with retrofitters to upgrade Plant Equipment Packages and General Reserve Educational orders with industry for facility surveys and planning Voluntary agreement to plan and coordinate conversion
Machine Tool	Voluntary agreement to help improve industry's responsiveness
Power Transformers and Circuit Breakers	Voluntary agreement to help improve industry's responsiveness Trigger order to increase production

TABLE 15-3

POSSIBLE APPLICATIONS - INFRASTRUCTURE

INDUSTRY	AGREEMENTS
Telecommunications	Industry integration committee (carriers and manufacturers) to resolve production bottlenecks and foreign dependencies Surge option clauses Standby agreement to participate in preparedness planning Voluntary agreement to coordinate emergency planning and operations Voluntary agreement to coordinate telecommunications service, maintenance, and restoration issues
Financial Services	Voluntary agreement to establish screening criteria for essential and deferrable loans
Electric Utilities	Standby agreement for facility vulnerability surveys and enhancement measures Voluntary agreement to identify preparedness options

- Use of educational orders to identify facilities requirements, train and qualify new producers, and purchase necessary production and test equipment

- Use of surge option clauses to identify production requirements and capabilities and provide for a timely response in emergencies by minimizing administrative lead times.

This report has also identified a number of possible new uses of these authorities. These include:

- Creation of voluntary agreements among subcontractor and supplier companies. This type of voluntary agreement, never widely used in the past, could let critical lower-tier industries determine how to support the demands of multiple production programs. (Past production-related voluntary agreements, organized on the basis of defense programs, could not effectively address "horizontal," lower-tier capacity problems that affected multiple programs)
- Use of voluntary agreements to help industries rapidly replace lost foreign sources or cope with other production disruptions caused by natural disaster or sabotage
- Use of voluntary agreements to improve the responsiveness of key defense-supporting industries that have been unduly impacted by changing economic conditions
- Use of standby agreements to identify ways to resolve bottlenecks by changing production or test specifications during an emergency.

15.2 BENEFITS

Wider use of voluntary and standby agreements could result in significant improvements in industrial responsiveness. For example:

- During an emergency, voluntary and standby agreements could promote more effective conversion of new producers, help identify and resolve production bottlenecks, and help maximize production within limited capacity

- Standby agreements could reduce the need for peacetime investments in standby production and test equipment by identifying changes in production or test specifications that could increase emergency output from current facilities
- If new production equipment or facilities would be required, standby agreements could provide an effective way to identify these requirements in peacetime so that they could be available sooner in an emergency
- A combination of voluntary agreements, surge option clauses, and educational orders could provide an effective instrument for peacetime conversion or expansion planning.

Standby and voluntary agreements could provide the basis for a more effective surge and mobilization planning program. By providing a focus for planning activities, guaranteeing access to commercial resources in an emergency, and defining the process by which these resources would be made available, these programs could provide assurance (that is presently lacking) that emergency production requirements could be met.

Although the cost of the program would be relatively low, it would require some investment by the Government. Voluntary agreements might not require substantial direct investments, but they would, at a minimum, require the dedication of a considerable amount of personnel time to establish, justify, monitor, and implement the agreements. A voluntary agreement involves a private-public partnership to resolve national security problems, and will require a substantial commitment from all parties -- a commitment that could be repaid through improved emergency responsiveness, security, and economic efficiency.

In the case of standby agreements, the Government must commit resources (principally Government and industry planners' time) to have an effective program. As our analysis in Volume 1 of this series suggested, creating a standby agreement (e.g., a surge option clause in a production contract) has little value without the necessary planning to identify requirements, identify the capability that would meet these requirements, and define activation procedures. In some cases, it may also be necessary to invest in enhanced capabilities.

Nevertheless, this could be an extremely cost-effective expenditure. Currently, within the Department of Defense, the two principal foci of surge and mobilization planning are investment in special tooling or test equipment and investment in "rolling inventories" of parts and components. While these investments in production capability involve lower costs than purchasing complete final products, they can still be very expensive. To date, it has only been possible to provide these enhanced production capabilities for a few weapons programs. If a standby and voluntary agreement program could identify ways to work around administrative and production bottlenecks, it could provide significantly enhanced industrial responsiveness at a much lower cost.

15.3 COORDINATING EMERGENCY PREPAREDNESS

Voluntary and standby agreements, together with less formal methods of industry-Government cooperation, could form the basis for a new approach to national preparedness. This new approach would provide:

- An increased role for the private sector in identifying and resolving problems during an emergency

- Increased emphasis on pre-emergency planning and identification of specific actions that would be performed during an emergency
- Increased emphasis on cost-effective options that can improve responsiveness to a wide range of emergencies
- Increased attention to the types of problems that would be likely to occur during different types of emergencies and the methods that might be used to address each of these problems
- Increased emphasis on improving the capability and responsiveness of important national security-supporting sectors.

While the Federal Government is larger and more capable than it was prior to past mobilizations, emergency planning functions have atrophied in many agencies in the past 15 years. The Federal Government is not effectively postured to carry out the many functions that would be required during a major emergency, and major funding is generally not available for preparedness investments.

In the past, industry has always played an important role in resource management during mobilizations. Even though the organizational model defined in our past two mobilizations (World War II and Korea) emphasized central federal control, industry played an important role in advising the Government, identifying and resolving production problems, and providing personnel for temporary federal service to help control mobilization activities. (Industry's role in past mobilizations is discussed in Chapter 2 of Volume 2 of this series.)

Figure 15.3-1 presents a simplified representation of some of the more important functions that have been performed

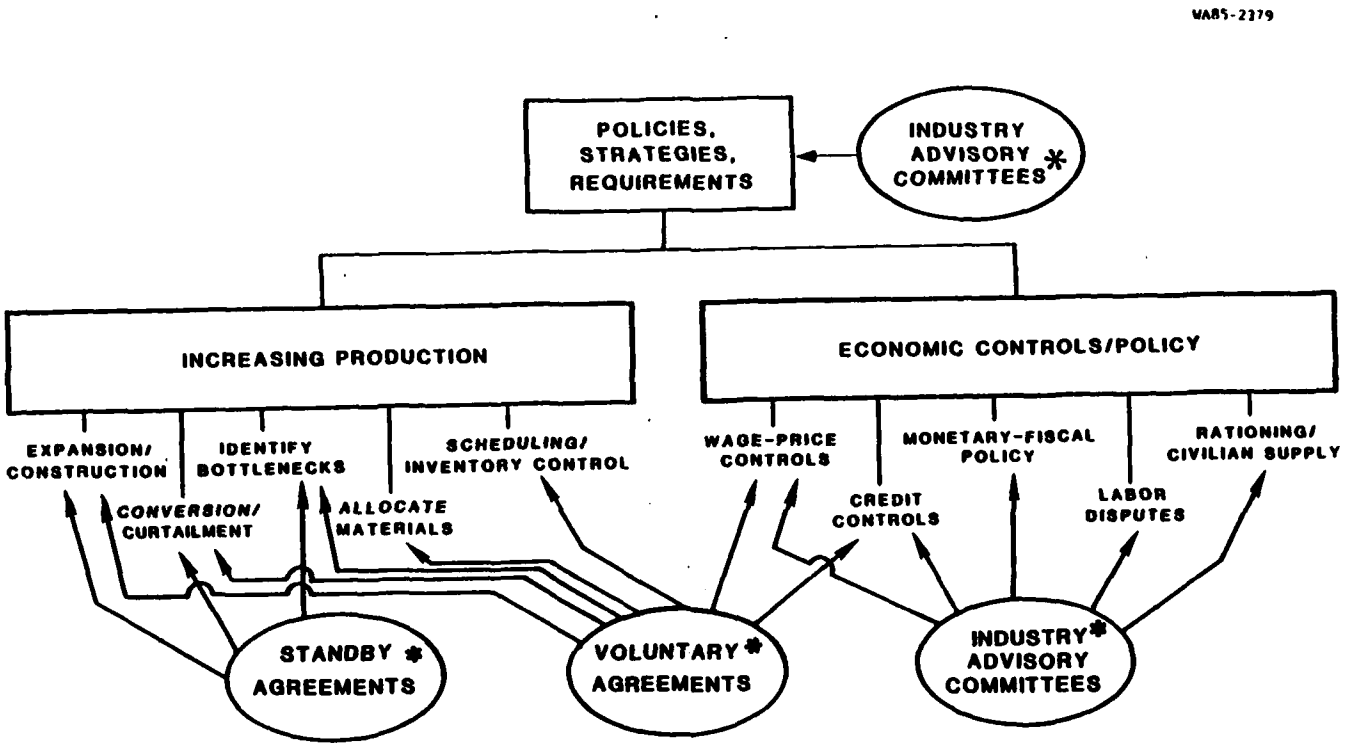

Figure 15.3-1 Coordinating Emergency Response

in past mobilizations. It also suggests how some of these functions could be planned for and carried out more effectively through the support of industry committees (including voluntary agreements) and pre-emergency planning with industry (including development of standby agreements).* By utilizing the expertise of the private sector, the Federal Government could provide discipline in the emergency planning process, identify cost-effective preparedness options that could be implemented widely, and help to minimize the confusion that frequently occurs in the early stages of an emergency.

15.4 TIMING CONSIDERATIONS

One advantage of increased reliance on standby and voluntary agreements is that they can improve the ability of U.S. industry to support a wide variety of emergency situations. Table 15.4-1 shows the different types of emergency situations where voluntary and standby agreements could be used. The following sections discuss some of these timing considerations.

15.4.1 Peacetime Planning

As shown by Figure 15.4-1, one advantage of using standby and voluntary agreements to improve preparedness is the fact that planning and development of agreements are the principal activities required during normal conditions. As noted in this report, relatively small investments (other than

*For a more general discussion of resource management programs in past mobilizations, see Reed, L. S., et al., "Resource Management: An Historical Perspective," The Analytic Sciences Corporation, TR-5035-3, Washington, D.C., 1984.

TABLE 15.4-1

USE OF VOLUNTARY AND STANDBY AGREEMENTS
DURING EMERGENCY SITUATIONS

AGREEMENT \ TIMING	PEACETIME PLANNING	BOTTLENECKS/DISRUPTIONS	SURGE	PRE-MOBILIZATION PREPAREDNESS	MOBILIZATION	CHAPTERS IN THIS REPORT
Voluntary Agreements						
Industrial Responsiveness Agreements	x	o				9,12,14
Lower-Tier Industry Agreements	x	o	o	x/o	o	3,4,6,7,8,11
Weapons Program Integration Committees	x	o	o	x/o	o	1,4
Other Agreements				x	o	12,13
Standby Agreements						
Surge Option	x		o	x	o	5,12,14
Educational Order/ Plant Survey	o	o		o		3,4,5,8,14
Equipment Trigger Orders/ Standby Purchase Agreements	x	o		o		3,4,8,10
Agreement to Change Specifications	x		o			2,5,7
Plant Expansion Agreements	x			o	o	10,11
Other	x					6,14

Key
x = develop agreement
o = implement agreement

industry and Government planners' time) are required to develop these agreements. The one possible exception would be educational orders, which could require investments to enhance industrial capabilities.

15.4.2 Peacetime Bottlenecks and Disruptions

While standby and voluntary agreements would not be widely implemented during "business-as-usual" conditions, they could be used to cope with a variety of peacetime problems that threaten defense preparedness. Voluntary agreements could be used to enhance the responsiveness of industries threatened by foreign competition or changing economic circumstances. In addition, voluntary agreements of critical lower-tier industries could be used to help resolve production bottlenecks.

Voluntary agreements could also be used to coordinate an industry's or weapon program's recovery from a major disaster, such as a catastrophic earthquake. Standby agreements could also improve disaster preparedness by surveying vulnerabilities, identifying remedial measures, and defining when these measures would be implemented.

15.4.3 Surge

A surge in production could be required to support conflict (or imminent conflict) by U.S. or Allied military forces, or it could be required to support a variety of emergencies not involving the threat of imminent conflict. A surge might occur for a single weapon system, selected critical items, or many critical items.

With the exception of changes in acquisition procedures or direct investments in end-item or component inventories or standby equipment, standby and voluntary agreements may represent the only feasible way to improve surge responsiveness. Surge option clauses would identify industry capabilities and help to avoid administrative bottlenecks in the procurement system. Standby agreements to change production or test specifications would be a cost-effective way to identify likely bottlenecks in peacetime and to correct them in the initial stages of surge. Agreements modelled on the CRAF program could provide immediate access to commercial resources. Voluntary agreements could also help to coordinate initial production efforts, although they could only contribute during the early stages of surge if they had been established on a standby basis before the emergency.

15.4.4 Pre-Mobilization Preparedness Actions

The principal difference between surge and mobilization, as the terms are commonly used by planners, is that surge relies on rapidly increasing output from current defense producers, while industrial mobilization would involve creating new defense production capacity, either through expanding facilities or converting nondefense producers. Because of this distinction, actions to surge production from the current defense industrial base will not necessarily prepare industry for subsequent mobilization. Indeed, surge could have a negative impact on subsequent mobilization preparedness if it consumed the time and resources that would otherwise be used for preparatory actions. Because of the limits on surge production (generally a doubling or tripling of current output) and the extremely high consumption and attrition rates for modern combat, significant capacity expansion efforts could be needed for many situations that fall far short of sustained, superpower conflict.

Development and execution of standby and voluntary agreements could provide an effective way to prepare for subsequent expansion during a surge in production. Educational orders for noncurrent producers could prepare them for subsequent production contracts. Equipment trigger orders could persuade equipment producers or mining companies to begin production of necessary equipment or re-opening mines before commercial demand had developed. Standby plant expansion agreements could be executed to begin construction of facilities that would be needed in the future. Agreements to enhance security at essential facilities might also be triggered, if circumstances warranted.

This phase would also provide an opportunity to complete preparedness planning actions that had been neglected in peacetime. Standby voluntary agreements could be created for weapons programs or industries that would be likely to require extensive conversion of new producers or to experience production problems in a mobilization. In addition, a larger number of voluntary agreements might be activated at this time to help coordinate these preparatory actions and to resolve bottlenecks as they arose. All of these activities would improve the mobilization posture of U.S. industry, but would still avoid the expense and potential economic dislocation of all-out mobilization. Thus, the programs could help provide a measured response to an increasing, but perhaps still ambiguous, national security threat.

15.4.5 Mobilization

During a major mobilization, voluntary agreements could be instrumental in coordinating production. At this time, agreements might be activated to help coordinate many major weapons programs and to resolve bottleneck problems in

many lower-tier industries. Another possible voluntary agreement discussed in this report, the financial services voluntary agreement, would probably be activated at this time, if not earlier. Disruptions, inefficiencies, and delays during the initial stages of mobilization could be minimized through use of these programs, especially if the preparatory actions discussed in earlier sections had been taken prior to the onset of mobilization.

15.5 SUMMARY

This report has suggested that voluntary and standby agreements show considerable potential to improve U.S. industrial preparedness. It has suggested a number of specific applications that should be considered, including several types of agreements that have not been established in the past. Increased use of these authorities could be a cost-effective way to improve industrial responsiveness and to provide a focus that is currently lacking for responsiveness planning efforts.

Pursuing these efforts will require a substantial commitment on the part of the Government -- of personnel as well as investment funds. Industry will not support these activities, or even take them seriously, if the Government does not commit these resources. Moreover, there would be little benefit in developing these agreements without the resources required to develop realistic plans and programs.

Although these programs are relatively cost effective, it will not be possible to pursue all potential standby and voluntary agreements at once. Because Government resources for improving preparedness and responsiveness are limited, it

will be necessary to make further analysis to identify the highest priority programs and industries. However, if the Government does commit the resources necessary to develop these programs, its investment could be repaid many times over, in terms of improved efficiency and responsiveness to a wide range of emergencies and an improved Government-industry partnership to address national security problems.

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